ITEMS OF INTEREST.

VOL. XVII. NOVEMBER, 1895. No. 11.

ORIGINAL COMMUNICATIONS.

SONG AND SPEECH—THEIR RELATION TO ARTIFICIAL DENTURES.

Dr. E. Randall Johnson, Buffalo.

Read before the Eighth District Dental Society, New York.

The voice is generated in the larynx in that portion known as the vocal cords, and is produced by a column of air coming in contact with them from behind, setting up a vibration; from there the sound is pushed along to the resonator, where it receives tone and brilliancy.

The resonator is composed of all of the cavities above the glottis, namely: The pockets of the larynx, the vestibule of the larynx, the pharynx, the mouth and the nose. It is of the last two that we will speak.

The cavities of the nose have for their base the hard and soft palates, and are divided into three irregularly constructed channels lined with mucous membrane. In singing or speaking there is a vibration of air established in these channels which is necessary for a portion of the brilliancy of the voice.

Should these channels be in an abnormal condition, such as a thickening of the mucous membrane, etc., they produce a dull, muffled sound indicating a lack of nasal resonance. The singer or speaker is also unable to inhale through the nose in sufficient quantities, so is forced to breathe through the mouth, thereby allowing air to enter the lungs at an improper temperature and not filtered as it is when taken through the nose.

There is a vibration in the teeth, as can be proven by placing the finger nail on any of the front lower teeth while singing the vowel "E," a vibration like an electric shock will be felt.

The arrangement of the teeth is a matter of great importance, for should any of the teeth be irregularly arranged in the arch, such as the upper front ones setting back of the line of the arch, or great space between the teeth, the overlapping of the teeth, or in fact any irregularity in their arrangement, the tone loses in roundness.

Where the singer has a high, thin voice she also has a correspondingly high vaulting arch; for the higher the arch the greater the expanse of the antrum is exposed to the vibrating influence; the floor of the antrum will also be found to be thinner in such cases.

Nature furnishes us with a fine illustration. Shout in a long narrow cavern in a rock and you get a high echo; the same shout in a broad deep cavern produces a dull, rumbling echo.

Yet persons with a high arch may not have a soprano or tenor voice, but a base voice with a high range. For several years, different men have been experimenting with appliances to increase the resonance of the voice. A number of years ago a dentist in New York made what he termed a "resonator;" it was a gold plate that fit around the teeth and covered the palatal portion of the mouth back to the soft palate; it did not prove a success, so was abandoned. Later, Dr. Carroll conceived the idea of making such an appliance of cast aluminum, but as it lay flat on the tissues it was of no avail and had a like fate.

I have been experimenting in this line lately, but have not had sufficient time to complete my investigations. My plan is as follows: On the model covering the hard palate you lay a thin piece of wax, allowing it to come within an eighth or three-sixteenth of an inch of the teeth, and the same distance from the posterior end of the proposed plate; make dies and counter-dies as usual and swage; this gives you a plate which looks as though it had a large air chamber in it, and that is just what you have, for the plate is held up by close contact to the teeth, and should it draw so as to form a vacuum, the plate should be punctured, as it is an air chamber instead of a vacuum that you want. I have used a number of thicknesses of aluminum, but find a thirty-standard-gage the best for the majority of cases. I have used some, however, as thin as thirty-four-gage and had fair results. The following is an extract from a letter from Mr. Fred Balcom, a leading tenor of this city:

> I send you under separate cover the thirty-four-gage aluminum resonator which you made for me, and which I crushed in my pocket through accident. Will you kindly reswage it as I have become much interested in the experiment. I find I can reach low tones with greater ease and think the high tones are easier, better and brighter with the resonator.

I have tried a thirty-four-gage in the mouth of one of the leading sopranos, but the results were not so successful as they were with the thirty-gage; with it she registered a tone and a half higher than without it; this, of course, must be accounted for from the shape of the arch.

An inexperienced singer would receive no benefits, as they have not the knowledge of where to place the tone; but with perseverance under a competent teacher, great improvement can be made. Even in oratory and in the voice generally, these lessons are of great importance.

How often are artificial dentures constructed on the lines of allowing the patient to produce the best tones? For instance, you are to make a rubber plate for a patient with a high, narrow arch; invariably the plate will be found to be very thick in the dome of the arch, thereby lowering the arch and sometimes the range of the singer's or speaker's voice correspondingly.

Then with the medium or normal arch, which is well rounded and not high, the general rule is that the average dentist will put in a large air chamber, "just to help hold up the plate you know." The tissues are thus drawn down into the supposed air chamber, thickening them over the floor of the nasal cavities; it also lowers the already medium arch so that it is almost impossible to get perfect enunciation of the closed vowels, such as "A" and "E." Its influence is also to take away from the singer's voice a part of its brightness and make rapid articulation in singing more difficult.

Probably the greatest objection to rubber plate for singers and speakers is that the rubber, being such a perfect non-conductor of heat and cold, keeps the roof of the mouth at such a degree of temperature as to predispose the membrane, lining the nasal cavities, to congestive influences. Another objection to both rubber and continuous gum plates is that as the bulk of foreign substance in the mouth is increased, the reinforcing capacity of the resonant cavity is proportionately diminished. As a final objection to a rubber plate we might urge that, owing to their thickness at the posterior portion, too much resistance is offered to the volume of air as it passes up through the throat and glides along the soft and hard palates, causing the singer to fear the plate may drop, in fact often throwing the plate down.

What shall we do? Our patients do not wish to pay for a gold plate. We will suggest that an aluminum plate be made; with it you get all of the good qualities of gold with the addition of lightness.

The objection of disintegration is, I think, ill founded. In my experience of about seven years in the making of aluminum plates I have never found a case of disintegration in a swaged plate.

In conclusion, I must lay great stress on the taking of the bite, for one of the greatest faults of any plate is that the bite is too short, bringing the artificial teeth too far up on the ridge and not restoring the original hight to the arch.

DENTISTS AS MECHANICS.

Dr. W. E. Driscoll, Manitee, Fla.

I presume almost every reader of dental literature within the past thirty years will admit that there has been an almost universal tendency to speak of the mechanical department of dentistry in a rather depreciatory manner, as of a disagreeable necessity; something that by no possibility could compare with a fair knowledge of the prescribing department, limited though it is, so far as dentistry is concerned.

So infatuated with this notion do we find some few in our profession the wonder is that they do not go over to the medical profession at once, where they would be entirely free from suspicion of possessing any mechanical ability or knowledge.

It would be as silly to try to belittle the theoretical part of dental science as the practical. But, in fact, the apologetic manner is noticed only when some one carefully reminds you he is not a mere mechanic, but, as the necessity unfortunately still exists to fall back on mechanical devices, he will tell how something in that line may be done.

A few years ago serious efforts were made to cut off from "professional" recognition all who descended to the menial level of plate workers. So certain did some writers become that the division could be effected that they prescribed the relations which should exist between the two, the exalted "oral surgeons" and the humble and humbled mechanics. For awhile it was to lose cast, to in any way question the propriety of the movement to divide the profession into a higher and a lower class. Dr. Richardson, author of the pioneer text-book on Mechanical Dentistry, is the only writer of prominence whom I recall who essayed to stem the tide in this direction.

When the larger portion of the profession can write and speak of all departments of dental theory and practice as equally creditable and necessary and honorable, we will honor our calling far beyond the ambition of those who would have elevated themselves by degrading others.

Dr. J. N. Crouse says: "If the dentine shows healthy sensation under the excavator, then it has a fit pulp to cap regardless of age of patient." Not always, doctor! Teeth often are quite sensitive under the excavator in many cases, if you will open into the pulp canal a drop of milky pus will exude. Such cases cannot be successfully capped. *H. L. Harlan.*

WHAT AND HOW TO EAT.

Dr. V. C. Bell.

This must be solved differently for different individuals. The food which is proper for one man may not agree with another. The student, or the brain worker, could not long subsist on that required by the laborer, or the out-door toiler. Time, age and occupation must all be considered before it may be said to any man: "Eat this or that kind of food." Yet, in spite of this difficulty, there are certain foods of which it may be said that they are safe to all.

The human body is composed of seventeen elements, the chief of which are hydrogen, nitrogen, carbon and the salts of lime. The various organs of the body are formed by varying combinations of a certain number of these elements, and these organs sustain and nourish themselves by extracting from the blood a sufficient quantity of the elements which enter in their formation, so that if the food is deficient in any one element, some one organ of the body is destined to suffer. As no foods, except milk and eggs, contain all the elements which enter in the structure of the body, it is apparent that to properly nourish all our organs, recourse must be had to a diversified diet. In this way the abundance of a certain element in one food may supply its deficiency in another.

Teeth strongly resemble bone in their composition. They are composed of animal and mineral elements. The mineral matter is the more abundant of the two, and consists principally of lime salts, such as phosphate of lime, carbonate of lime, fluorid of calcium, and phosphate of magnesia. These elements give to the teeth their strength and hardness. If they are absent to any market extent, the teeth are weak, frail and soft.

By careful experiment, it has been found that the following foods contain these elements in greatest abundance:

MILK.—This is the representative food, as it contains every element which enters in the structure of the body; but as it is a ready absorbent of microbes, it should be boiled before it is given to children. The boiling kills the microbes.

BUTTERMILK.—This is valuable as a food, except when it is churned from very sour milk, or has become cheesy by age.

CHEESE.—This should be eaten sparingly, as it is indigestible; a little, however, may aid digestion.

THE CEREALS.—Wheat, maize, rye, oats and rice, are very valuable foods, because they contain so many of the constituents needed for life and health.

Fine flour, however, should be sparingly used, because in its preparation the lime salts and phosphates are extracted. Thus, it has been estimated that five hundred pounds of Graham flour contain seventy-five pounds of muscle, and eighty-five pounds of bone material, while an equal quantity of white flour contains only sixty-five pounds of muscle, and but fifty pounds of bone material.

EGGS.—These are highly nourishing. They should be used "soft-boiled," and not hard-boiled, as the latter are less digestible. Eggs should always be eaten with a little bread and salt, as this renders them more wholesome.

MEAT.—Of all meats, beef and mutton are the best regular foods. If rightly prepared, meat is very nourishing and digestible. Among other nourishing meats might be mentioned pork, veal and poultry. Meat, however, should not be eaten excessively, and should never be used unless carefully prepared.

FISH.—When fresh and well cooked, fish are very nourishing.

BEANS.—The nutritive value of beans is higher than that of any other vegetable. Among the most valuable varieties may be mentioned the kidney, the haricot and the lima.

PEAS.—Peas have qualities similar to beans, but not in the same degree.

POTATOES.—If properly cooked, these make a valuable food. When cold they are indigestible. They are best when boiled with the skin on, or when roasted. Potatoes contain valuable potash salts, which are lost in boiling without the skins, but are retained in baking and stewing.

VEGETABLES.—Cabbage, parsnips, carrots, onions, tomatoes and beets are good foods when eaten moderately, but if taken in large quantities are indigestible.

These are but a few of the many valuable foods which a bountiful nature has placed at man's disposal. Only those are enumerated in the above list which are important from the standpoint of the teeth. They are equally valuable, however, in building up the rest of the body. For a more extended discussion of food, I refer the reader to some work on hygiene. In our libraries may be found many books treating of this topic most exhaustively and explicitly. Their perusal will repay the reader with compound interest.

The consequences which result from a neglect to use proper food cannot be overstated. It is because of this neglect that so many of our boys and girls, while yet in the full bloom of youth, are compelled to wear artificial dentures. One eminent writer has even said, "We are becoming a toothless people." Of course he

did not imply that our ancestors did not suffer from decayed teeth. They certainly did, but through an examination of their remains, we must conclude that they did not suffer from dental troubles to the extent that we do.

Our inventions and discoveries have revolutionized science and art. They have even changed the character of our food. The tables of the rich are to-day loaded with delicate, dainty viands, from which have been extracted the phosphates and lime salts, the elements that build up the bones and the teeth. It is because he eats such food that the child of riches often has weak, ill-formed teeth, and because the child of poverty subsists on coarse flour, he enjoys a wealth of teeth that money cannot buy.

Having now learned "What to eat," we have yet to learn what few, indeed, understand, "How to eat," for the evils resulting from a neglect of the latter will more than balance the good derived from an observance of the former.

How to Eat.—However nourishing may be the food one eats, it can yield little benefit unless it is properly eaten.

1. It is to be thoroughly masticated.
2. It should not be taken in excess, nor the maxim forgotten, We eat to live, and do not live to eat."
3. It is not to be taken too hot or too cold.
4. The stomach must be allowed freedom of movement.

It is self evident that if the stomach is overloaded by excessive eating, or if the food is bolted and not thoroughly masticated, the work of digestion will be poorly performed, the stomach become disordered, and the saliva acidified. The acid saliva, as already shown, destroys the teeth.

It is equally evident that since the food digests most readily at a temperature of about 98° F., if that which is very cold or warm is taken in the stomach, its temperature is materially lowered or raised, and to that extent the work of digestion is checked.

Nor need I add that if the free movement of the stomach is restrained by stays or tight corsets, it cannot perform its functions properly. A slender waist gives to a woman an unhuman form, and is produced at the cost of health and happiness.

Pyrozone, three per cent, moistened with pumice, adding one or two drops of phosforic acid, used for cement fillings, is good for green-stain on teeth. A tumbler of warm water, containing a little carbonate of soda, is good for rinsing the mouth.

S. B. Palmer.

THE NATIONAL ASSOCIATION OF DENTAL FACULTIES.

The following is a list:

University of California, Dental Department—L. L. Dunbar.
University of Denver, Dental Department—R. B. Weiser.
Columbian University, Dental Department—J. Hall Lewis.
National University, Dental Department—J. Roland Walton.
Southern Medical College, Dental Department—F. Holland.
American College of Dental Surgery—Louis Ottofy.
Chicago College of Dental Surgery—Truman W. Brophy.
Northwestern College of Dental Surgery—J. A. Whipple.
Northwestern University Dental School—George H. Cushing.
Indiana Dental College—George Edwin Hunt.
University of Iowa, Dental Department—A. O. Hunt.
Louisville College of Dentistry—Francis Peabody.
Baltimore College of Dental Surgery—M. W. Foster.
University of Maryland, Dental Department—F. J. S. Gorgas.
Boston Dental College—J. A. Follett.
Harvard University, Dental Department—Thomas Fillebrown.
Dental College of the University of Michigan—J. Taft.
Detroit College of Medicine, Dental Department—G. S. Shattuck.
University of Minnesota, College of Dentistry—T. E. Weeks.
Kansas City Dental College—J. D. Patterson.
Western Dental College—D. J. McMillen.
Missouri Dental College—A. H. Fuller.
University of Buffalo, Dental Department—W. C. Barrett.
New York College of Dentistry—Frank Abbott.
Ohio College of Dental Surgery—H. A. Smith.
Western Reserve University, Dental Department—H. L. Ambler.
Pennsylvania College of Dental Surgery—C. N. Peirce.
Philadelphia Dental College—S. H. Guilford.
University of Pennsylvania, Dental Department—James Truman.
Meharry Medical School of Central Tennessee College, Dental Department—G. W. Hubbard.
University of Tennessee, Dental Department—J. P. Gray.
Vanderbilt University, Dental Department—H. W. Morgan.
Royal College of Dental Surgeons of Ontario—J. B. Willmott.

The following colleges were admitted to membership:

University College of Medicine, Dental Department, Richmond, Va.—L. M. Cowardin.

Atlanta Dental College—Wm. Crenshaw.
Birmingham Dental College—T. M. Allen.
Cincinnati College of Dental Surgery—G. S. Junkerman.
Cleveland University of Medicine and Surgery, Dental Department—S. B. Dewey.

PETITION FOR PREVENTING INFECTIOUS DISEASES.

Recognizing the fearful mortalities which are daily reported from infected districts abroad now ravaged by Asiatic cholera, and the apparent lack in all the present fields of infection (except India) of any even alleged prophylactic measures (except hygienic or sanitary), and recognizing the general lack of effective prophylactics at our command in combating this disease; and though we do not fully concur in the belief in all the allegations of the promulgator of arsenization, we do ask, for the sake of science and equity, that our compatriot and colleague, Dr. R. B. Leach, of Paris, Texas, be placed in some one of the infected countries; that there he may test an hypothesis pronounced by our Marine Hospital Bureau Surgeons, at Washington, as "incontrovertible except by test," by Dr. Paul Gibier, President Pasteur Institute (N. Y.) as "theoretically perfect," and by many other colleagues (in the language of Dr. J. D. Westerval, of Texas), as "a theory which rests upon secure, firm, solid and sound foundation."

To Dr. Leach's hypothesis we respectfully call your attention, and to the fact that the only other alleged prophylactic of Asiatic cholera is promulgated by Dr. Hafflins, of Paris, France, and that said doctor is under favor of his, the French Government, and we ask a like recognition for an American medical innovation by an American Congress.

Some time ago, a lady who had perhaps reached the shady side of fifty, came to me for a full set of teeth. I soon found that, woman-like, she wanted "pretty" teeth. So I selected a set, to the utter disregard of temperament, etc., that would have really suited her daughter admirably. She was delighted with the effect, and the other members of the family, quite a large one, became my patrons. I realize that "the highest perfection of art is to conceal art," but have never regretted having made that set of teeth.

J. H. Crossland.

FILLING ROOTS.

In Alabama Society.

I think there is no better agent with which to effect the final removal of septic matter from root canals than peroxid of hydrogen. When chemically pure, it is nothing but water with an extra atom of oxigen loosely combined. It cannot be kept very long, as it soon gives up its extra atom of oxigen, and you have nothing left but water. For this reason it is necessary to combine acid with it. Free hydrochloric acid makes it an excellent germicide. Indeed, for that purpose, the hydrochloric acid alone is just as good as when combined with the peroxid. I have tried different makes, testing from the unbroken packages, and all have sulfuric acid in them. So if you have no hydrogen peroxid, try hydrochloric or sulfuric acid and you will get as good results.

There is no question but that peroxid of hydrogen is a detergent and cleanser. Many canals are small and tortuous, so that it is very difficult to get in them. In such cases I believe in using the Gates-Glidden drill. When we have failures, it is because we have failed to do the work thoroughly. Each one should use the method which brings the best results at his hands. If you succeed, why change your method?

I do not regard sulfuric acid as dangerous in any strength, but I generally use a solution of about six parts water to one of acid. I like hydrochloric acid for pulp canals.

FOR A NATIONAL DENTAL LIBRARY.

The following resolutions were passed at the last meeting of the American Association:

"*Resolved*, That this Association formally adopts the Army Medical Museum and Library as the National Museum and Library of the dental profession of the United States."

"*Resolved*, That a committee of five be appointed by the chair to cooperate with the Army Medical Museum and Library Managers in enriching its stores of dental literature and museum specimens, especially by appealing to dental societies and individual members of the dental profession for material assistance."

The committee appointed in pursuance of the latter resolution consists of Drs. Wm. Donnally, of Washington, D. C.; J. Taft, of Cincinnati, O.; H. J. McKellops, of St. Louis, Mo.; Frank Abbott, of New York city; and Henry W. Morgan, of Nashville, Tenn.

CEMENTING CROWNS.

Having the root and crown ready I warm the crown, and apply a thin coating of chloro-percha to the post. The chloroform evaporating, leaves a film of heated gutta-percha. Immediately the crown is adjusted to the root and removed. This shapes the gutta-percha on the post. The crown is then allowed to cool, and is cemented on as though no gutta-percha was used on post. A crown so cemented can be removed at any time by repeated applications of the thick part of the heated root-canal drier to the metallic portion of the crown, which communicates the heat to the post. In a short time the sheath of gutta-percha around the post is softened, and the crown can usually be removed without difficulty. I also attach ordinary bridge-work in this way, having abandoned the use of methods classed as "detachable," which only allow the bridge to be removed by the dentist.

You all know you can cement on a crown very firm, if you have a nice fitting post, with a little film of gutta-percha alone. Here is an ordinary root that has been capped in the usual way, and the post alone is secured with gutta-percha, and nothing put in the cap; try that and see if you can move it. I question if I could move it with the pliers without heating it.

Geo. Evans.

The National Association of Dental Examiners express the conviction that it is becoming evident that the dental schools are increasing in number beyond the needs of the public, owing to the tendency of medical schools to inaugurate dental departments. The installation of dental departments in connection with medical schools is necessarily often incomplete, and therefore the committee believes that restrictions should be placed on the rapid increase of inefficient dental colleges. As the practice of dentistry is largely based on knowledge of chemistry and bacteriology, and as manual training has become an integral part of the curriculum of some of the better schools, we recommend that the Association do not in future recognize any school unless satisfactory evidence is furnished that the students of such schools applying for recognition are being taught in modern chemical and bacteriological laboratories, and are also furnished with every convenience for manual training in prosthetic and operative dentistry, and that this latter mode of practical instruction is systematically carried on in at least the first year's course.

INHALING CHLOROFORM.

Dr. A. Guerin, of Paris (*Lancet*), says that death from chloroform may be avoided if inhaled exclusively through the mouth. When death occurs from stoppage of the heart, the cardiac muscular fibers cease to contract under the influence of a reflex action exerted by the nasal nerves on the pneumogastric, stimulating the inhibitory power of the latter on the heart. He further shows that when a rabbit is subjected to tracheotomy, and then made to inhale chloroform directly through the trachea, the drug has no effect on the heart. On the contrary, when chloroform is held before the nose of the rabbit, the heart immediately stops. The trachea being cut transversely, it is obvious that the chloroform inhaled by the nostrils can not reach the heart through the bronchi. Dr. Guerin therefore assumes that the anesthetic agent exerts its injurious action on the movements of the heart through the intervention of the nasal nerves and the cardiac branches of the pneumograstic, the former acting reflexly on the latter. He also advises that the nose of the patient be held by the fingers till general anesthesia is produced, when there can no longer be any reflex action of the nasal mucous membrane anesthetized like the rest of the body.

Prof. S. J. Willey gives the following rule for manipulating oxiphosphate: While it is very difficult to formulate any exact set of rules which will meet the requirements of every dentist, because it is difficult to find any two who are governed by the same rules; yet, after a long series of experiments and consultations with the very best operators in the profession, we find that the following rule will be an excellent guide to those who have not yet adopted the methods here suggested: Pour on a small glass plate enough fluid for your purpose. Put beside it enongh cement powder for the filling. Draw the powder gradually into the fluid, and with a stiff spatula quickly rub the mixture into the consistency of cream, bearing hard all the while on the spatula, gradually manipulating it without any more powder. When the mass has become sufficiently plastic, apply it to the tooth cavity in the usual manner. It is necessary to emphasize the fact that no more powder must be added to the mass when it has been worked to the consistency of cream, and that continued manipulations, without the addition of any more powder, will gradually bring it to that degree of plasticity which is essential to a hard, unshrinkable, and bony mass.

ARTIFICIAL WHALEBONE.

The process consists in first treating a raw hide with sulfid of sodium and then removing the hair. Following this, the hide is immersed for a period of twenty-four to thirty-six hours in a weak solution of double sulfat of potassa, and is then stretched on a frame to prevent contraction in drying. The dessication is allowed to proceed slowly in broad daylight, and the hide then exposed to a temperature of 50 to 60 degrees. The light, combined with the potassa absorbed by the skin, renders the gelatin insoluble in water and prevents putrefaction, the moisture being completely expelled. The skin is then subjected to a strong pressure, which gives it the hardness and elasticity of the genuine article. Any color may be imparted to it by a dye bath, and it can be made further resistant to moisture by a coating of rubber or varnish. Another article is also given in the Boston *Journal of Commerce*, July 6th, on the manufacture of artificial rubber.

It is a good thing for young men to appreciate that there is something more to be done by the dentist than the mere humdrum every-day work of his office. The broader his intelligence the more power he will be able to exercise over his fellow-men, as we find illustrated in the medical profession. Occasionally we find a young man educated in this respect, and he goes out under vastly more auspicious circumstances than one who is crowded into the narrow groove of mere routine professional work. Though he may understand all the branches of the curriculum so that he is able to pass them well, there is a still broader range of knowledge that he ought to have, and that would help him greatly in his special work. This range includes the progress that is being made in the various departments of science, theoretical and applied, of which electricity is an illustration. Of course no man can understand everything, but it is well that there should be a broad view of all these subjects. We should have more knowledge of all the range of subjects that come within our purview, and then we shall better understand the causes of things, and do better work, than if we are simply crowded down to the narrow space of the every-day technical and operative duties of our profession. *J. Taft.*

The dentist should at all times be scrupulously neat and clean, not only in his person, his dress, and everything in that line, but he should be clean internally as well as externally.

A. H. Mc Candless.

CURRENT THOUGHTS.

THE ACTION OF NITROUS-OXID ANESTHESIA.

Dr. George F. Kemp, of Johns Hopkins University.

The chest cavity, which contains the lungs, is in reality an air-tight box with movable sides, made up of the ribs and sternum with the muscles about them, and with a movable muscular bottom, the diaphragm.

Inspiration is produced by a number of these muscles acting co-ordinately together, and moving the ribs, sternum and diaphragm in such a way as to enlarge the chest cavity. This produces a partial vacuum, and, when the glottis is open, air passes in through the trachea and expands the lungs.

Normal expiration is a passive movement entirely. When the muscles of inspiration relax, the thorax resumes its former position, and the lungs, which are on the stretch during inspiration, squeeze out the air by their own elasticity.

The muscles which produce inspiration are under the control of a definite nerve-center in the medulla oblongata. Sometimes, especially when for any reason the blood becomes poor in oxigen, this center is stimulated, and it not only makes the ordinary muscles of respiration act with greater power, but calls into activity other muscles not concerned in quiet respiration, so that we have what is known as forced respiration. Under these circumstances expiration is no longer passive, as it is normally, but we have powerful expiratory muscles coming into play, whose duty it is to force the thorax together and help to drive the air out of the lungs.

The centers which govern these muscles of respiration are to some extent under the control of the will, but not entirely so. They usually act independently of volition, and, if strongly stimulated, will act in spite of volition and behave with a certainty that can be counted on almost as a machine. This is what I wish to emphasize to explain their action during anesthesia. We may take a deep breath, or we may hold our breath at pleasure; but no one can commit suicide by holding his breath, for, after a time, the venosity of the blood becomes such a strong stimulus to the respi ratory center that respiration takes place in spite of every effort of the will to prevent it. In persons drawn unconscious from a well, this forced respiration is strikingly shown, and will often go on for hours, owing to excitation of these centers, even after the patient has been brought into the fresh air. Bear in mind, then, if you please, that these automatic respiratory centers do their work and

respond to stimulation long after all higher centers of consciousness have succumbed.

In taking up the study of anesthesia by nitrous oxid, we must naturally begin with the blood, since it is by this that the anesthetic is carried from the lungs throughout the system. The blood normally contains three kinds of gas—oxigen, carbon dioxid and nitrogen. The oxigen is nearly all combined with hemoglobin in the red corpuscles; the carbon dioxid is mostly combined with certain salts dissolved in the plasma; the nitrogen is simply dissolved in the plasma of the blood without relation to the salts. All water absorbs gases when brought in contact with them, and the water of the blood is no exception; so that, in addition to the oxigen combined with the hemoglobin, there is an amount of free oxigen dissolved in the plasma, and the same may be said of carbon dioxid which is dissolved in a similar manner. For our purpose, however, we can disregard the oxigen and carbon dioxid, which is dissolved in the plasma simply by virtue of the water which it contains; though, when we study the effect of N_2O on blood, we shall find that practically all of the anesthetic is taken up in this way. As long as any tissue is alive it consumes oxigen and gives off carbon dioxid, and the greater the activity the greater will be this gaseous exchange.

A careful study of the blood-gases in nitrous-oxid anesthesia, therefore, reveals not only whether the blood is incapacitated for carrying an amount of oxigen to the tissues requisite for their life, but also gives an idea as to whether the vital activity of the body as a whole has been depressed by the action of the anesthetic.

When Sir Humphry Davy first advocated the use of N_2O as an anesthetic, he advanced the theory that the gas was respirable, the tissues being able to appropriate the oxigin of the nitrous oxid for their own use, throwing off the nitrogen. Later this view was abandoned, and some teachers have swung to the other extreme, going so far as to say that nitrous oxid was really poisonous, forming a compound with the hemoglobin of the blood which prevented this hemoglobin from taking up oxigen, and, in fact, killing in the same way as carbon monoxid. A third theory, which is probably most widely taught to-day, is that nitrous oxid is not a true anesthetic, but produces anesthesia simply by asphyxia. All three of these theories are incorrect, the first two flagrantly so. We are all familiar with the old adage that "Where a candle will burn, life can be supported," but nitrous oxid is an exception to this rule. A candle will burn brightly in nitrous oxid and a smouldering stick will burst into flame, but life will soon become extinct. Analysis of the blood shows that it is doubtful if any nitrous oxid is decom-

posed in the system, and, if such is the case at all, the amount is so small that it need not claim our attention.

Concerning the second theory—viz., that nitrous oxid is poisonous by forming a very strong compound with hemaglobin, so that oxigen cannot be taken up—I would say that this is likely due to some extent, to some writers, who, in quoting the work of others, have confounded nitric oxid with nitrous oxid. When oxigen unites with hemoglobin, it forms a definite compound which gives to arterial blood its bright color. As the blood passes through the systemic capillaries and gives up oxigen, it loses this bright color, due to oxihemaglobin, as shown by the darker color of the blood in the veins. In the pulmonary circulation, the hemaglobin, which had lost its oxigin readily, unites with new oxigen in the lungs to form oxihemaglobin again, and thus a fresh supply of oxigen is continually carried to the tissues. Hemaglobin has the power of uniting with other gases besides oxigen. The most notable of these are carbon monoxid and nitric oxid. The affinity of carbon monoxid or of nitric oxid for the hemoglobin is so great that when it comes in contact with oxihemaglobin, it drives out the oxigen and unites with the hemaglobin itself. Hemaglobin, thus united, cannot carry oxigen from the lungs to the system, so that gases which form such undecomposible compounds with hemaglobin belong to the most dangerous of poisons. Nitrous oxid is positively not of this class. Under peculiar conditions it may form a compound with hemaglobin, but this compound is not of the dangerous class referred to, nor are the conditions for its formation found in the body. There is no marked affinity between nitrous oxid and hemaglobin as it exists in the blood. When brought freely in contact, no compound is formed. Even when all the oxigen has been removed from the blood by a gas-pump, nitrous oxid refuses to unite with the hemaglobin. The same thing is demonstrated by its action on the system. A man who has been breathing coal-gas, in which carbon monoxid is the chief poisonous constituent, may die from slow asphyxia hours after he is brought into a healthy atmosphere, and the spectroscope will reveal in his blood the presence of carbon monoxid hemaglobin. Within a few minutes after recovery from nitrous oxid anesthesia, the most careful spectroscopic examination of the blood would never reveal that the patient had been breathing anything but normal air. The theory that nitrous oxid poisons in the way that nitric oxid or carbon monoxid does is thus positively refuted by both clinical experience and chemical analysis.

The widely accepted theory that nitrous oxid anesthetizes only by asphyxiating has more that may be said in its favor, or

rather it has more to excuse it than the other two theories have, but a careful study will show that this theory also fails to put the case in its true light.

Any one who has seen patients anesthetized by nitrous oxid, and has observed the livid and ghastly expression which the face often assumes, cannot help being struck by the fact that in most cases there is a condition of asphyxia; but to say that it is only the asphyxia that produces anesthesia, or to say that the asphyxia must be pushed to the danger point before the patient is anesthetized, is going too far. How, then, is the anesthesia produced?

Analysis shows that blood absorbs just about as much nitrous oxid as the same amount of water would take up. We have seen that the nitrous oxid does not unite with the hemoglobin, and we may say in a word that there is no other constituent of the blood for which it shows a special predilection. It is, therefore, fair to assume that the nitrous oxid is taken up in the lungs solely by the water of the blood, and is thus carried in simple solution to the tissues.

Asphyxia is produced not because nitrous oxid is present, but because oxigen in an available form is absent. After all the air is shut off and nitrous oxid is turned on, the system will run for a very brief time on what was in the blood and a slight reserve store in the tissues themselves, but when these supplies are exhausted the patient will succumb, unless fresh oxigen be admitted.

When nitrous oxid is breathed with sufficient air to prevent asphyxia, there is still enough of the sweet taste and intoxicating effect to convince any one that the gas is not inert, and if the cutaneous sensibility be examined it will be found to be blunted.*

If the gas were a more powerful anesthetic, or if it were more soluble in the blood, it could be given as ether or chloroform, mixed with enough air to meet all the demands of the system. In practice it is often given so as to exclude all air, and therefore produces asphyxia. The asphyxia then acts in conjunction with the true anesthetic properties of the gas to deepen the anesthesia; but this condition dare not be long maintained.

It is a law of physics that the greater the pressure of a gas on a liquid, the more of the gas will the liquid absorb. When a liquid is pressed on by a mixture of gases, each individual gas exerts a pressure corresponding to its proportion in the mixture, and the

* It is interesting, from a historic standpoint, to note that the first intimation of the usefulness of nitrous oxid in dentistry was obtained from such a case. Mr. Cooley, a druggist at one of Colton's demonstrations, while partially under the influence of nitrous oxid, and in a condition of excitement, knocked the skin off his leg, but felt no soreness. When he observed this, he is said to have made the remark: "I believe a person could have a tooth extracted and not feel any pain."

liquid takes up of any of the gases in proportion to the pressure which this gas exerts. At the atmospheric pressure the blood will take up enough nitrous oxid to anesthetize; but when we dilute the nitrous oxid with any considerable amount of air, the partial pressure of nitrous oxid in the mixture will not cause enough of it to be absorbed to produce this anesthesia. In accordance with this law of absorption in proportion to partial pressure, Paul Bert argued that if we cannot add enough nitrous oxid to the gas mixture breathed to make the blood take up sufficient nitrous oxid for anesthesia, we can accomplish the same purpose by increasing the total pressure at which the gas mixture comes in contact with the blood, so that with the mixture of nitrous oxid and air the partial pressure of the nitrous oxid will be equal to its full pressure when given by itself at the ordinary atmospheric pressure. This should give nitrous oxid enough to anesthetize, and air enough for all demands of the system.

To produce this effect he had an air-tight cabinet constructed, into which patient, operator and assistants could enter, and air was then pumped into this till the desired increase of pressure was obtained. The result of giving nitrous oxid mixed with air under these circumstances proved completely the correctness of his theory, and nitrous oxid was administered for serious operations of long duration, with perfect anesthesia and without the ordinary pallor attending complete anesthesia by nitrous oxid at the ordinary pressure.

Later he found that with due precaution he could admit enough air at the atmospheric pressure to sustain life, without diminishing the partial pressure of the nitrous oxid so much as to prevent the absorption of sufficient nitrous oxid to produce anesthesia. In other words, with proper care he could keep a patient anesthetized without the use of his pneumatic cabinet, by simply regulating the amount of air and of nitrous oxid breathed. Under these circumstances, he could avoid asphyxia of such a degree as to be dangerous.

When anesthesia need only be maintained for a minute or less, it probably makes comparatively little difference whether air be admitted or not; but for longer anesthesia this is necessary. In the same way, if anesthesia is to be continued, the patient should never breathe the same air over and over, but some form of inhaler should be used which allows the expired air to pass out without resistance by one valve, and at the same time allows the proportion of nitrous oxid and air to be regulated by a separate arrangement, and the mixture to be drawn in without effort on the part of the patient.

Regarding the small supply of oxigen which suffices to keep the patient alive while anesthetized by nitrous oxid, I may mention, as one of the points held, that there is some ground for supposing that the metabolic activity of the tissues is diminished by the nitrous oxid, so that less oxigen is demanded than under ordinary circumstances. An analogous condition is found as a normal thing in hibernating animals.

Attention was next directed to the tracings with which this communication was illustrated. These tracings were taken on continuous paper in direct experiments on dogs. The blood-pressure and pulse were recorded by a mercury manometer, the respiration by a Marey tambour. Any change in the rate or force of the heart-beat, any rise or fall of blood-pressure, or any alteration in the rate or depth of the respiration, is shown in such a way as to strike the eye at once and be capable of measurement.

On these tracings were shown: (1) The effect of nitrous oxid when given without air so as to produce asphyxia; (2) The continuation of anesthesia without dangerous asphyxia when a small amount of air was admitted; (3) The difference between the action of nitrous oxid and of nitrogen when given pure and pushed to asphyxia and death. This contrast was striking, and showed how blunted the sensibility of the animal was when under nitrous oxid compared with nitrogen. It also showed that anesthesia was fairly well developed before asphyxia became marked; (4) The point at which artificial respiration (alternating pressure on the thorax) could be relied on for resuscitation after respiration had stopped. In rapid anesthesia, of short duration, when the gas is pushed in its pure state, as is usual in dentistry, the heart continues to beat for some time after respiration has stopped, so that by adopting some efficient method of artificial respiration on a patient, there is always a good margin for resuscitation even if the anesthesia has been incautiously pushed too far. This was illustrated by tracings from experiments on animals.

In explaining the tracings, attention was called to the graphic record of the activity of the heart-regulating, vaso-motor and respiratory centers, and the response of the centers to stimulation while the high centers of consciousness were completely quiescent.

It has been taught by some writers that nitrous oxid has a baneful action on the kidneys. Both albuminuria and glycosuria have been ascribed directly to its influence. Many of the cases reported as illustrating this would have to be set aside as not proven so far as the responsibility of the nitrous oxid is concerned. The writer and Dr. Brush made some extended observations in this field on themselves, and as a result of the most careful ex-

aminations, no abnormality of the urine was detected after anesthesia by nitrous oxid. The writer had nitrous oxid administered to him nearly every day for a period extending over several weeks, but no albumen or sugar was found in the urine. In all cases of investigation of this character the condition of the subject of experimentation should be known, and control experiments should be made both before and after the administration of the gas and the examination of the urine. Reports of isolated cases here and there in which fabulous amounts of albumen or sugar were found in the urine are of little value in comparison with systematic investigation, including proper control experiments. The preponderance of evidence from this kind of work is that neither albumen nor sugar is found in the urine as the direct effect of nitrous oxid, after one long-continued anesthesia, or after repeated anesthetizations in a given period of time. That sugar might possibly occur in the urine after prolonged anesthesia by nitrous oxid is not impossible. We know that the drug curare has a marked effect in diminishing the control of the nervous system over the metabolic activity of the system with a transient glycosuria as the result, and if nitrous oxid should produce the same secondary effect, transitorily, it would not be surprising; but this is a very different thing from saying that it produces diabetes. Carefully conducted researches on a number of cases would make a very acceptable addition to our knowledge on this point.

Nitrous oxid under pressure has been used in France for surgical operations of all degrees of severity, and later it has been used at the atmospheric pressure by simply exercising due care in admitting a certain amount of air with the gas. In Germany it has been used to some extent in obstetric practice, and also in surgery. In this country it has been used in very severe cases of surgery, notably by Dr. Brush, of Brooklyn, to whose interesting article on the subject I take pleasure in referring those interested. This article gives some account of Dr. Brush's large experience, together with suggestions as to its practical administration and the proper form of inhaler to be used. It is to be found in the *Brooklyn Medical Journal*, pages 289 to 298, May, 1890.

Cosmos.

If we teach our patients to be punctual, and be punctual ourselves, it will be much better for us. One of the greatest detriments to a busy dental practitioner is the tardiness of patients, but if the dentist is as careful about his punctuality as he requires his patients to be, it will be of great advantage to him.

A. H. McCandless.

THE DENTIST IN HIS PROFESSION AND AMONG THE PEOPLE.

Dr. S. B. Hartman, Fort Wayne, Ind.

The central thought was that the dentist, to receive proper recognition, must know something more than the mere details of his every-day work. The first thought as to what relation a dentist sustains to his country and profession is his first step as a student. While mechanical skill, which he would in no way depreciate, is of great importance, yet if our profession is to stand side by side with other professions, it must find its coming members not merely of those with an inclination for mechanics, but of those who combine with this a knowledge of scientific and physical laws and a general understanding of those studies that will tend to an education that will admit the student to the society of the learned professions. He rejoiced that the colleges are making the examination for admission of a high standard. The better the general education of the dental student, the better will be the dental practitioner, not only as a dentist but as a citizen. He would also make morality a consideration of admittance to the profession. Coming in contact often with those of sensitive natures, how important for the welfare of the dentist, and of the community in which he lives, that his character be above reproach; hence character is paramount in the admittance of a student.

After the student, the next consideration is the practitioner. An education outside of his profession is of great importance, that he may not only be admitted, but sought by the best society. While it is true we have comparatively few men of attainments beyond what is required in the care of teeth, yet there are many who are taking advanced standing and endeavoring to raise dentistry to the sphere it should occupy. Dental societies help to broaden thought—the mingling of persons having like interests incites a zeal to advance. Local societies have a salutary influence on each member. Dr. Hartman believes that great good would be obtained if each alternate meeting could be devoted to questions not pertaining strictly to the profession, as history, biography, current events.

We all have a peculiar influence on others. Science teaches that no force is lost, but goes on and on. A great writer says: "The meeting of persons on the street has an unexplainable influence, and little do we know to what extent it may extend." Apropos of this thought, Dr. Hartman told of a call he made on a dentist in Detroit, who had been casually mentioned to him by a friend as one who had made the study of microscopy one of his pleasures

outside of professional duties. Little was said between them of dental practice, much of their conversation pertaining to things not visible to the naked eye, but it seemed to the writer that great fountains of knowledge had opened to him during the interview. We should not live entirely within the four walls of our office. Better that a dentist should have one dental journal and two literary, than two dental journals and no literary magazine.

How can the attendance of our Associations be increased? The small attendance is not entirely from outside causes. Dentists not members, desire its privileges and enjoyments, but do not become members lest restrictions conflict with their ideas of conducting their practice. In one of the States represented here to-day are five hundred dentists, and the entire membership of its State Association is only about eighty, and an attendance of fifty members would be considered large. The four hundred and twenty dentists not members are largely composed of men from the same schools as the Association members, who, during college life, stood side by side with them, passed the same professors, and have good standing in society. What is needed is a great outreach to those out of our Association. It may be that some of the minor regulations of its management should be changed. Dental colleges graduate students as worthy; why do not the associations receive them? Either the colleges graduate men whose practice is not in accord with dental ethics or the associations are at fault.

Cosmos.

ACTION OF ANESTHETICS ON THE PULMONARY CIRCULATION.

This subject was examined by the Glasgow Committee, consisting of McKendrick, Coats, and Newman. They found that the action of chloroform, ether, and ethidene on the lungs consists in retardation and subsequent cessation of the circulation, first in the capillaries, then in the small arteries, and lastly in the larger vessels. The epithelial cells with their nuclei in the alveoli become invisible. The capillaries are contracted, and their walls become less distinct, and the blood corpuscles present in them are partially dissolved. These phenomena are chiefly those of inflammation, due to the action of chloroform as an irritant. The consequences of arrest of the pulmonary circulation have already been considered under the head of death beginning at the lungs. When the vapor of any anesthetic, even of chloroform, is sufficiently diluted, its local action on the pulmonary circulation will be small; but if a concentrated vapor enters the lungs, either from being

driven in by artificial respiration or drawn in by a sudden deep inspiration, it may prove a serious factor in stopping the circulation.

THE REAL DANGER FROM THE HEART.

The real danger which is dreaded, and most justly, by anesthetists, is not a mere weakening of the pulse, nor even an occasional intermission, but a stoppage of the heart, which appears to be sudden and complete, which yields to no treatment, and persists in spite of all attempts to restore the cardiac pulsations. This may occur simultaneously with the failure of respiration, or may apparently precede it.

NATURE OF THIS DANGER.

The symptoms recorded are those of neuroparalysis, as given by Caspar, and the question at once suggests itself: (1) Are these symptoms produced, as in Caspar's cases, by suffocation; or (2) are they due to the shock of operation; or (3) are they really caused by the anesthetic? Previous to the report of the Glasgow Committee, it was generally believed that even though chloroform might weaken the heart, its action was gradual; but that committee observed in several experiments a sudden slowing or stoppage of the heart, with a great consequent fall of blood pressure. These sudden, unexpected, and apparently capricious stoppages were attributed by the committee to the action of chloroform. The cause of such stoppages was carefully examined by the Hyderabad Commission, which came to the conclusion that they were not due to the anesthetic, but to irritation of the vagus by asphyxia. By the Glasgow Committee the action of the vagus was regarded as a source of danger; by the Hyderabad Commission, at the suggestion of Dr. Bomford, as a safeguard to the animal, by preventing too much chloroform reaching the medulla. These opposite views have each experimental evidence in their support. The action of the vagus is indeed complex; it would appear that it may at one time be beneficial and at another prejudicial. It is certainly remarkable that in an animal like the rabbit, which may sometimes have difficulties in the way of breathing freely in its burrow, the vagus seems peculiarly easily irritated by stimulation of the nose or closure of the nostrils. Moreover, it is almost impossible to stop a healthy heart permanently by irritation of the vagus, however strong or long continued. These facts seem to show that stimulation of the vagus is not dangerous, but rather beneficial, so long as the heart is healthy. But, on the other hand, when an animal is suffocated and just about to die, the respiration and cardiac pulsations having both stopped completely, it has been found by Dastre and Morat that the heart is not really

paralyzed, but is inhibited by the vagi, and when these nerves are cut it will again begin to beat. It would thus seem that just as the heart is failing the action of the vagus puts a final stop to it. Here the vagus seems harmful, and one would naturally think that if the division had been made earlier death might have been averted. But experiments showed that this was not so, the contrary being the case and the heart failing earlier. But whether we regard the effect of the vagus in stopping the heart as useful or prejudicial, the occurrence of such a stoppage during anesthesia is a sign of danger, because it indicates more or less interference, either with the respiratory movements or the respiratory passages, a condition which, as Caspar has shown, may lead either to death by asphyxia or by neuroparalysis (shock). The similarity between many cases of sudden death occurring during the administration of anesthetics, and especially chloroform, and those of death by shock from simple strangling or throttling, strongly suggests that they result from the same cause—viz.: *neuroparalysis* due to interference with the respiratory passages. *The Lancet.*

OUR PROFESSIONAL STANDING.

Dr. J. C. Walton, Howell, Mich.

The higher we rise in culture and refinement the more our lives, and the world, must become to us. Good and bad luck are little else than good and bad training. Men embrace their chances because they have education sufficient to see them. One supplies the dental needs of a patient with artistic bridge-work and pockets a large fee; another applies the forceps and follows with a five-dollar set of artificial teeth—perception *versus* blindness. Not one in fifty of our fraternity are students in the sense the speaker would have them. The systematic use of our reason, as developed by early habits of study, must be added to mere finger-craft if we are to be considered educated dentists. We do not expect a student to make a perfect gold crown without much practice; so we should not expect him to reason out the inharmony of placing such a crown on an incisor root, unless he has exercised his mind in observing the connection of ideas, and, following them in train, sees the result before he has begun, is shocked by the incongruity, and chooses a less objectionable way.

The differences so observable in men's understandings do not arise so much from natural faculties as from acquired habits of use. This, in a broad sense, is education. An educated man is one trained to methodical thinking, and whose memory is a magazine

of facts. The school is the mental training ground, and books the source of supply for his memory. It is estimated that a common school education adds fifty per cent to the productive power of the laborer, an academic education one hundred per cent, and a university education from two hundred to three hundred per cent. What wonder if there is lack of sympathy between such and the "hewers of wood and drawers of water" in the profession? The advantages of education to mechanical skill may be illustrated by reference to Watt, Cartwright, Whitney and Fulton. If Stephenson and Edison seem exceptions, we point you only to their hard work in self-education, and still claim that all the great steps have been taken by trained thinkers.

There are evidences in our current literature that some are beginning to take statesmanlike views of our profession. This is a hopeful sign. Our position relative to other professions, to our *confrères*, our competitors, our patients, the public and the privileges that duty to our family dependents and ourselves demands, seem to afford vital topics too little discussed, that outrank history and biography as fit subjects for dental conventions. Dental societies have accomplished much. The representative plan of the American Dental Association and its satellites has been wise. But times are changing, and there is evidence that the objects of organization for the future society will be the greatest good to the greatest number, instead of organized support to the imaginary dignity of the *élite*. The writer waits anxiously the time when dental societies shall be made attractive to the majority, and shall be the special agency for the supervision, extension and development of the profession as a whole. Looking to the future of dentistry, the question to-day most pertinent to its welfare is, What are they doing? The educators of to-day are making sentiment for the future, as educators of the past have influenced us.

Cosmos.

Repairing Rubber Plates.—Place broken parts together and hold by dropping on melted sealing wax or flasking parts; teeth downward in a softened cake of modeling compound; pour cast; remove part from cast and trim off from proximate broken edges from one-eighth to one-fourth of an inch; roughen sides and bathe in rubber dissolved in chloroform; place parts back on cast; wax up the intervening space where the crack was, and invest in flask; separate and pack rubber as usual. The object of the whole process is to remove entirely the old flaw in the old rubber and replace with new. *Charles H. Gale, Fairbault, Minn.*

COMPENSATION.

Dr. T. W. Brophy, Chicago.

There should be more regard paid to the duty of the dentist to himself and to his family. I am one of those who believe the greatest injustice that the dentist does is to himself, and through ignorance or lack of information, I might say, on the part of his patient, this injustice is done. It is a remarkable fact that the greatest service that the dentist renders his patient he receives no compensation for, and that service is rendered in the treatment of his patient. Take, for instance, the management of diseased teeth. Who will assert that he receives the same compensation from his patient for the time, the energy, and skill in the management of these patients that he does for the insertion of gold fillings? One gentleman says he does. I know he does, and I know that others ought to do likewise. But it is a fact that very few attempt to deny that the hardest and most difficult of all of our tasks is the management of diseased teeth. The preparation of delicate pulp canals, the cleansing of them antiseptically and the filling of them, and the preparation of the teeth for the insertion of the filling, require much labor. There are scores of people who seem to think it is the duty of the dentist to do this for nothing, and that after this is done, which constitutes about two-thirds of the work necessary for the preservation of pulpless teeth, he should be paid for the insertion of the filling, and that everything which precedes that should be done for nothing. The dental profession is largely responsible for this. Many permit themselves to do this work largely without compensation, and then charge a fee for the insertion of the filling. It is the duty of every dentist, in my judgment, to do everything he can to promote the interest of his patient, to hasten the treatment as fast as he can conscientiously do so, and do it intelligently; but he should be compensated for every visit the patient makes. Anything short of that is a professional detriment to his profession. To take up a case where pulps are exposed, which in many instances are in a hopeless condition, devitalize them, remove them, prepare the canals, and fill them, and do all that which is so frequently required of us, without much compensation, is the greatest injustice to the dentist himself as well as to the profession. One of the duties of the patient to the profession, or, rather, to his attendant, is to fully appreciate the value of the service rendered. I am one of those who believe that there is no dentist who receives compensation on an equality with the service rendered by other profes-

sional men. Take the physician or lawyer. A certain lawyer in Chicago not long ago received a fee of $85,000 from a corporation for the transaction of legal business. How long would a dentist have to serve an individual, or group of individuals, to receive $85,000 as compensation? A very long time indeed. It is our own fault, and as long as we continue to treat our patients for nothing, as is frequently done, just so long will we have to do so. The moment we declare ourselves professional men, and demand that our time shall be compensated for, and that our patients must pay for visits, we will be far better off in the end. I am glad there is a movement on foot to adopt a different practice in this regard, and if we can do this we will, ere long, find ourselves in a different position. Dr. Sitherwood remarked that many of his patients who came to him for treatment felt that they should not pay anything for preliminary treatment. That is wrong.

Dental Review.

A NATIONAL DENTAL MUSEUM.

Dr. H. B. Noble, Washington, D. C.

Some years since I claimed exemption from jury duty as a surgeon, and after a legal battle was sustained in this position, and no dentist has since then been placed in the jury-box.

Many cases in actual practice have sustained this position. A case in point: The jaw of Hon. William H. Seward, the Secretary of State under President Lincoln, was broken in his attempted assassination. A dentist of New York (Dr. Gunning) was called on to take charge, and did take charge, at the request of the Surgeon-General of the United States, and conducted the case to a complete restoration, and to the satisfaction of every one.

If we are dental surgeons and a specialty of the medical profession, let us take our proper place in the National Medical Museum and Library, unfortunately so little known, and slightly appreciated by the dental profession throughout the country.

Here we have in a fire-proof building a valuable collection of specimens and books, under the efficient management and fostering care of Dr. John S. Billings, and maintained at government expense. It is a part of, and on a par with, the other scientific departments of government.

Here should be found a history of dentistry and a general depository for dental archives of all things pertaining to it which may have a present or a future historical or educational value.

That the profession is imbued with the spirit of homage to those whose labors and achievements have elevated our calling to

a place among the liberal professions was made manifest at the late gathering in Philadelphia to honor the name of Horace Wells, the discoverer of "anesthesia."

Could there be a more appropriate place for the repose of memories, whether of marble, bronze, or painted canvas, or one's own laboriously collected library?

Such a museum and library would be an appropriate place for the proposed statue of Dr. Horace Wells, surrounded by a library such as that of Dr. H. J. McKellops, of St. Louis, and the historical collection of Dr. Taft's committee of the World's Columbian Dental Congress.

Here should be recorded all the great and important inventions and scientific discoveries that have been and are being made, and the names and record of eminent and celebrated men who have labored for the advancement and elevation of our profession. Many of these records are now in the keeping of local societies and individuals, and if not soon cared for will be lost to the general profession.

Such a museum, library, and memorial hall, in connection with the National Medical Museum, would receive the aid and fostering care of the general government, and be under its care and protection.

If we work in harmony with the medical profession, such a hall and library of our own can be secured. *International.*

ROOT-CANAL FILLING.

In the Odontological Society, of New York.

Dr. Darby: With me oxichlorid is the best for this purpose. I have used it for twenty years.

Dr. Louis Jack: The results of clinical observations appear to establish the conclusion that on the complete obliteration of root-canals of devitalized teeth depends the prevention of after-disturbances of the peridental membranes at the apical region.

If open space remains, it will inevitably become at length occupied by organic matter, which enters by imbibition through the foramen, or by the channels of the canaliculi of the fang, which at length must acquire an infectious quality, and will sooner or later have the specific character which has been elucidated by Dr. Miller.

This consideration must also apply to all methods of root-filling, when attempts are made to occlude the apex with porous substances charged with antiseptics, as when the antisepsis terminates by the diffusion of the chemical the porous filling-material

is little better than an open space. In my experience the most dangerous conditions have accompanied cotton filling in roots.

To the filling of canals where they are of good size and can be easily made accessible, such as the six front teeth, the palatal roots of upper molars, and distal roots of lower molars, I have found no substance so good for filling the apical portion of the canals as small cones of gold-foil malleted into place, the remainder of the root being filled with gutta-percha or oxichlorid. For the small canals of bicuspids, the buccal canals of upper molars, and the mesial roots of lower molars, the oxichlorid or chloro-percha pumped in as far as attainable have been my usual reliance.

Dr. E. C. Kirk: Fill the desiccated canal with melted paraffin and pack in a gutta-percha cone of proper size and shape, avoiding excess of paraffin.

Dr. A. W. Harlan: There are three substances which may be used to obliterate canal space—wax, gutta-percha and paraffin. All are unalterable in the root of a tooth, all comparatively easy to introduce. Not one of these materials will absorb moisture or deteriorate in its presence in such a place as a root. The roots must be dried and a solvent used to liquefy gutta-percha, wax, or paraffin. After a portion of the liquefied substance is introduced, a larger, more solid piece, attenuated or pointed, may be packed directly into the roots till they are completely filled. Force, combined with gentle heat, will be sufficient to pack the roots full of either material. I prefer gutta-percha. Teeth will not be stained by deterioration of the filling-material, and no permanent soreness will ensue if a small quantity is forced through the apex. It will exfoliate or become encysted.

Dr. C. N. Peirce: I have but a few moments to reply to your inquiries. Without doubt in my mind, gutta-percha when properly applied or inserted makes the most complete root-filling; but it is only mechanically so; as you know, it has no therapeutic influence. With zinc chlorid or some other good antiseptic in advance of it, it probably cannot be excelled. Salol I have used with great satisfaction, but experience with it is of too recent a date to say what of the future.

Dr. S. H. Guilford: The fact that so many substances have been used by different practitioners, with apparently equal success, makes it difficult to designate any particular one as best. Years ago gold-foil, employed by those who were really skilful in its manipulation, produced most satisfactory results. Gutta-percha and oxichlorid followed, and appeared to answer their purpose, while later carefully-prepared sheep's wool furnished a record of usefulness unsurpassed by any of those that preceded it.

Large experience and length of time have, I think, about decided that for ease of introduction, perfect filling of the space, non-shrinkage, and unchangeableness, together with its aseptic qualities, oxichlorid heads the list of materials suitable for root-canal filling.

Dr. L. D. Shepard: I judge you want the methods which each uses, and not theorizing. For very many years I have used the red gutta-percha, which I roll in a fine and long cone. This may be two inches long and tapering from one-sixteenth to one-thirty-second of an inch at its greatest diameter to a point. Working some chloroform in the canal, I take the cone in a pair of delicate forceps, hold it a moment or so in chloroform, so that the outside is softened or partially dissolved, and then press the cone, *cold*, in the canal. This cone, while soft and sticky on the outside, is, as a whole, stiff, elastic and yielding, and I am quite sure, "obliterates the space."

Dr. John S. Marshall: In my judgment, chloro-percha and gutta-percha points most perfectly obliterate this space.

Dr. McQuillan: I consider, where care is used not to force the material through the apical foramen, that the oxichlorid is the very best for filling the canal.

Dr. J. B. Littig: The best method of root-canal filling is the one wherein we place in the root-canal a few fibers of cotton, twisted on a smooth broach and saturated with oxichlorid.

Dr. J. Y. Crawford: I believe the very best results in filling root-canals can be accomplished by thoroughly drying, and when exudates have ceased from the apical region, trim a small, fine needle of orange or some other wood made sterile by proper treatment, and around the tiny end of which roll a small quantity of Abbey's soft gold-foil, and then top it in the apical third of the canal, after which the remaining portion of the canal can be filled with any of the reputable root-fillings desired, except tin, lead, and amalgam. The objections to the tin, lead, and amalgam are that they are factors in the discoloration of pulpless teeth when placed in the roots. I believe by this means that space in the canals can be most effectually obliterated.

Dr. G. V. Black: Gutta-percha cones, not started in the canal with pliers and a hit-or-miss effect made to force them home, but stuck on the end of a properly-shaped root-canal plugger, the size having been ascertained by trial, and sent to place with certainty. (The canal is to be well moistened with oil of eucalyptus first.) Canals too small for this are done the best I can with gutta-percha dissolved in chloroform, but this only when I cannot do better.

Dr. J. N. Crouse: I would recommend the following method:

Put some oxichlorid at the entrance of the root-canal; then wrap one or two thicknesses of No. 10 gold around the end of a broach, dip it in oxichlorid, and push it carefully in the end of the canal, using it as a medium to carry the oxichlorid. The gold should be lapped loosely around the end of the broach, so that when it is carried in the root-canal the broach can be removed, leaving the gold and oxichlorid at the end of the canal. Gold can be carried in this way to the end of the smallest canals; and by taking a watch-maker's pivot-broach and drawing the temper just enough to get the blue color, you have a spring temper which I think makes the best instrument for filling in this manner. If the gold is carefully wrapped around the broach, and the oxichlorid is carried ahead of it, the canal is thoroughly filled and all the air is excluded. This practice has given me the best results, and I cannot remember when I have had trouble with a root which was filled in this way.

Dr. R. R. Andrews: I do not know which method furnishes the most complete obliteration of space in root-canal filling. My simple method works well; after cavities are prepared, I use chloroform, then liquid gutta-percha, then gutta-percha points, then heat with hot air, and pack solidly.

Dr. Foster: I am of the opinion that the complete obliteration of the space in the canal and tubuli is never fully accomplished. I am under the impression, from clinical experience, that the filling-materials best adapted for this purpose are chloro-percha or oxichlorid and salol. The method of filling is nearly the same with such materials—a complete isolation of the canal from the fluids of the mouth, thorough dryness of the canal, and, when salol is used, the tooth is to be heated; then fill with salol by pumping it in the canal with a broach. Capillary attraction will aid its introduction.

Dr. J. Taft: In reply to this question, it may be said that every canal should be thoroughly cleansed and formed with the least practicable loss of material to best facilitate the introduction of whatever material is used.

There are several methods of filling these canals by which all the space can be filled. It is well, after the preparation of the canal, that it should be closed at the end of the root as nearly as practicable; then form a cone-shaped piece of lead, or even a fine-grained piece of wood saturated in some antiseptic fluid; carbolic acid or creasote would serve the purpose. These should be made as nearly as possible of the same shape as the canal, so that on being pressed in it would fill it, without, however, great pressure. When this cone-shaped lead or wood is prepared, it may be coated on the surface with oxiphosphate, and then pressed firmly or driven

lightly in the cavity, cutting off any portion that may protrude from the canal or pulp-chamber. By this method not only would the space be completely occupied, but the open ends of the tubuli would be filled. Of course other materials than lead or wood may be used, as gold, silver, copper, or tin. None of these are better than lead or wood. By this method the canal will be absolutely filled.

Dr. Truman: I am asked to reply to two questions. First, Which method of root-canal filling furnishes the most complete obliteration of the space?

This hackneyed subject has become so exceedingly wearisome that I might be pardoned for tersely stating that no method will obliterate all canals, and it is believed this would be strictly true. It will in the main be true of the central canals, and is always true of those minute canals permeating the dentine rarely or never taken in consideration. The question, however, does not embrace this more extended view, and hence we are left to the question as stated.

There are a great number of filling-materials that will fill the space, if that be all that is required. In ordinary canals gold answers an excellent purpose, and it cannot be gainsaid that some who practiced the method in the first period of root-filling, of whom the writer was one, were quite as successful in results as at the present. But, then, gold or any metal cannot be forced in the minute canals for any depth, as in the superior buccal canals of molar teeth or the anterior roots of the inferior. We are then left to other materials, and, for the same reason as applied to the metals, must discard cotton. The plastics are alone left, and the recently advocated agent, salol, melting at a low heat. Of the plastic materials, gutta-percha, if made in a semi-solvent solution, would probably fill all non-microscopic canals. There would always be a doubt about it, as there is no possibility of proving the fact. The value of gutta-percha as a filling-material is here left out of the question as not germain to the subject.

The next in importance, if not transcending the previous materials, is oxichlorid. It is by no means certain that this when made in a thin semifluid can be forced in minute canals, but it would probably do this better than gutta-percha.

If all that has been attributed to salol be true—that when melted it will run by capillary attraction in the minutest canals and then speedily harden—we have at our command the best material. The question is, do we know this to be true? Extended experiments out of the mouth in freshly-extracted teeth placed in exactly the same position as in the mouth will alone settle the ques-

tion. All the processes known as wood filling, gold-wire filling, etc., may be left out of the question, as they cannot, strictly speaking, fill anything; also, agents used on cotton or asbestos fiber, such as the balsams, as they cannot reach minute canals.

It thus seems to me, in considering this question, that, for the mere purpose of filling minute canals, salol promises better than any other material. If this were all that is required in canal filling we might rest content; but it unfortunately is not all. Indeed, in the opinion of the writer, it is the least important of the points to be considered.

It almost reaches the point of absurdity to query as to what is best to fill the central canal when the organic matter in innumerable canals is left to the tender mercies of the germs of putrefaction and eventual discoloration of the teeth. As salol is not expected to do more than fill the main canal, and in a degree render it aseptic, that agent which will do more than this—not only fill the canal possibly to its minutest ramifications, microscopically considered, and then by its coagulating properties reach the organic contents of the tubulated structure—must be the best; and I therefore hold that there is nothing superior to chlorid of zinc, for it will, as far as known, quite effectually fill the canals and coagulate all dead material in the dentinal tubes.

Dr. Ives: For the last ten months I have discarded everything in root filling for the following: First, accurate measurement of the root-canal; second, the use of a copper wire; third, the preparation of pure beeswax in a water-bath, to which is added any antiseptic you use—iodoform, if you wish. I take a thread of the beeswax, and with a spatula roll it down to an absolute point. This, fastened on the end of a nerve-instrument, I pass up as far as possible. With an Evans' root-dryer, heated, I drive the wax in the tubuli, adding wax till the canal is full, then with my heated copper point, which protrudes slightly in the pulp-chamber, I send it right to the end. I know that every part of that root-canal is absolutely filled. What space there is between the side and the copper point is filled with the beeswax. Beeswax does not expand nor shrink, and it is not affected by acids or alkalies.

International.

Two ounces of glycerin and the same of soft water, and nineteen grains of carbolic acid in crystals; apply twice a week and you will soon be free from dandruff, and your hair will be soft and shiny. We usually get double the prescription.

Mrs. D. E. Atwood.

OUR OFFICES AND APPEARANCE.

Dr. F. O. Hetrick, Ottawa, Kan.

Our offices should be as near like our homes as they can be, if you want to have a quieting effect on the patient. They should suggest rest, ease; and the sight of instruments will have an opposite effect. I formerly thought I must have a case where all of my instruments should be in sight, beautifully polished up so you could see your face in the handle of the forceps, and I had also a pair of turnkeys to show them what instrument of torture was in vogue years ago, and I found a patient would go and look at those things and say, "Oh! why, doctor, are you going to use those on me?" Now, as far as I can, I have everything out of sight, and my operating-room away from the reception-room. There is a great deal more in that than you may think of. You have your operating-room off of your reception-room, and several patients come in there; they are good friends, and they get to raising a good deal of disturbance in the way of hilarity sometimes, and you may be working for a nervous patient, and you may have been working for them up to that point; they feel they cannot stand anything more, and those people are talking and having a good time; your patient can't hear what they say, it is a strain, and so I have my operating-room now where I can shut it off and have absolute quiet, and I have it, as far as I possibly can. I keep my instruments where they cannot see them. You may think that don't amount to anything. I have seen operating-rooms where the cabinet stood right in front of the patient all the time. Mine stands at the side, and it is opened as little as I can have it open and get what I want.

I am free to say, as a rule, our dental offices are in process of evolution for betterment, but I have gone into dental offices where I have been satisfied that that knob or bracket had not been cleaned off in a year. You may not be able to put many hundreds of dollars into your reception- and operating-rooms, but the general effect on a stranger stepping into an operating-room which is run down at the heel is very bad. If you stop to consider that if there is a clean office in town, where that patient knows she can get a decent piece of work, she will never come back to you if you have uncleanly surroundings.

I will admit that mine is not kept always as it should be. If I were able to, I would keep a girl scraping and dusting all the time. It produces a beneficial effect on the patient's mind when they step in; they know they are going to be treated in a cleanly way. And then your appearance. You do not need to be a dude,

but you need to be clean. You may have to wear ready-made clothes, but you do not need to have your necktie on the side of your neck and your hair in a great big twist that has been so for a week.

Then your manner; this has a wonderful bearing on the patient, and you have not any business to leave the operating-room under circumstances that will put the patient in an excitable condition.

Many of you have practices which necessitate the keeping of an assistant in your reception-room. It is one of the blessings of a large practice to have some one to meet your patients and talk to them, so that you are not interrupted by every step to the door, and you can have it understood when they come to your office they are not required to rush right into your operating-room where you have a patient, and grab your hand and jerk you all over the office. You cannot meet people without unconsciously exercising an influence over them; your mind unconsciously to yourself, will influence their subjective mind. That brings us to the matter of conscious or unconscious telepathy. There is that between every one of us; it is conscious or unconscious as we are in the passive and subjective condition. You meet patients, and unconsciously they will catch that excitable, or hot, or fretful—I won't enumerate the conditions you may be in. You make a bad impression on them to start with, which you cannot overcome in yourself. So keep a calm, reserved, quiet, forcible attitude toward your patient. We need to study people; we have been studying books a long time, but we have done very little studying of people. Did you ever study a class of people and how you could affect that class? Did you ever study individuals, and see them respond to certain lines of suggestion, that unconsciously to them you are influencing them? If you have not, you have fallen short of your privilege as a man or woman. It is really due to magnetic influence.

Western Journal.

DENTAL TRAINING.

Dr. G. W Warren, Assistant Editor of International.

Questions of dental education are occupying much attention in the journals and dental society meetings, especially at our annual gatherings, and are often treated from a narrow and erroneous point of view. There are those—usually who know little or nothing of practical teaching—who feel that they are annually called on to assail the dental colleges and their methods of instructing; others calling for difficult entrance examinations. Some would have it so high as to exclude all who have not a classical education, etc. Such examinations many of these advocates would themselves utterly fail in were they put to the test.

The school which requires a rigid entrance examination and has a large faculty, teaching a great variety of subjects—all of which may be good in their way—may fail to graduate students who will make successful practitioners. Its students may have what Professor Gross designated as "photographic memories and microscopic brains." They may be store-houses of dental and medical theories, and yet fail utterly as practitioners, and never contribute a single fact to the advancement of their profession. As the *Journal of the American Medical Association* says editorially on the subject of professional education, "Many writers use the term medical [or dental] education, as if it were something complete or finished. Diplomas are often considered as evidence of this, and are offered as guarantees of scientific skill."

These are sad delusions; a medical or dental education, we may say, is never finished, and the true aim of our schools is, or should be, to train men to observe and to think for themselves, not to overload them with theories. The mere memorizing of the facts which are seen by the microscope would never make a practical microscopist; and this holds true in any other channel of scientific work. The assumption of truths without personal examination, and the inability and want of training to examine independently, is too often the case. The facts must be sought for, examined, and compared.

The dental school that trains its students to be explorers, to study accurately the various phenomena of health and disease in and about the dental organs, inspires them to be ever on the alert for new facts, or new conceptions of old ones, who are never learned but always learning, is the ideal one.

Students should not be allowed to accept the facts presented in the lecture- or clinic-room by their teachers, and found in their text-book, as conclusive, but should be trained to verify these by personal examination and experimentations. Too often have students, who by memorizing a few facts as given by the incumbents of the several chairs during the lecture course, been given their diplomas with the full right to practice, and to be accepted as representatives of the profession. But dental teaching is each year, through the efforts of the Association of Dental Faculties, being placed on a more uniform and broader scale. More time is given to the several laboratories and class-rooms, where the instructions are more of an individual nature, and where the student is taught and encouraged in using his powers of observation and reason, and, in making personal experiments, to be accurate and true. Manual training is an important factor in dental education, and those who were fortunate enough to attend the meetings of the

National School of Dental Technics, recently held at Asbury Park, must have been impressed with that fact. Dr. E. C. Kirk, an acute observer, in commenting on this point, says, "The application of the laboratory method in dental education, the introduction of the technic method in our schools, by bringing the instructiou in operative and mechanical dentistry and therapeutics in line with the laboratory method as utilized in the departments of pathology, chemistry, and histology, is a most important step toward cultivating a scientific habit of mind, and a desire for original research among the dental students of to-day, which must tend to elevate our standards and ideals, and react favorably on our future methods of practice."

Now that dental teaching has reached a broader and more uniform basis, our schools should require something more in the way of examinations than recitations and the memorizing of facts. The mere gathering and storing of dental knowledge can never make a successful dentist. While no college can educate a man in the true sense, yet they can prepare him to use his powers of observation and reason; and when a student realizes his limitations and the personal equation of error that is liable to complicate his observations, he becomes a scientist in the highest meaning of that word. Of course all of us cannot be scientific investigators in the broad sense, but, as has been observed by others, it is, after all, a matter of degree, for every one is, or should be, capable of observation, and able to interpret and report such observation.

While many of our colleges are excellent, they have not, as a rule, introduced this matter of personal observation and the recording of same in their curriculum. We have the medical journal referred to above as authority, that an English medical school has recently adopted a plan requiring all senior students to spend a good portion of the last year in observing and writing up cases, the notes of which are corrected by the teachers. In this way the senses and reason are trained to observe and compare the relation of facts—a move, we think, worthy of emulation.

It is easy to advise parents, but difficult to get them to carry out the advice given. In many cases they are hindered by circumstances. They cannot afford the money nor the time needed to carry out the suggestions. The desire to save teeth was going to an extreme with dentists. In many cases patients cannot, or will not, pay for the treatment necessary to save teeth of poor construction, and it would be better to extract such teeth.

W. S. Sherman.

GREEN-STAIN.

Dr. W. C. Barrett, Buffalo, N. Y.

Probably fifty per cent of the teeth that fall under the observation of the dentist are affected by some form of pigmentation. Dentists have speculated on it ever since there was a dental profession; but till the time of Miller there never was, so far as I know, any such series of scientifically conducted experiments to positively determine its nature and character as could be accepted as definite. I cannot but believe that he has permanently settled the question of the etiology of this appearance. If he is right, that determines its classification. After the President of this Society had refused to accept my declination of the honor which he tendered me nearly a year ago—that of preparing this paper—it was my good fortune to have Professor Miller as my guest for some days, and we went over this whole subject together. I was then, as now, convinced that those who have criticised his article as inconclusive, either had not read it carefully or had not comprehended it fully. It was inconclusive in so far as it failed to support the crude theories previously advanced, but it was conclusive in establishing the fact that the so-called green-stain is usually a superficial deposit, and that it probably has no special pathological signification, except for diagnostic purposes.

When Dr. Miller was at my house, he had with him a large number of teeth exhibiting the stain, some of it green, some brown, some red, with the varying intermediate shades. There were the teeth of children, and of adults at different ages. There were a few cases in which, beneath the stain, was found eroded enamel, and there were many instances in which no sign of decalcification existed under it. There was indisputable stain on decayed tissue, and it dropped in and followed the depressions of furrowed enamel; but in no instance, so far as I could observe, did it appear other than as a distinctly superficial deposit. We removed the enamel-cuticle, or Nasmyth's membrane, from teeth on which there was a marked pigmentary deposit, and in every instance the stain came with it, leaving the tissue beneath it clear, white and unmarked. This was the case in instances of furrowed enamel, in teeth with eroded enamel, and in those in which the enamel seemed comparatively perfect. Let me say, however, that teeth whose enamel is uneroded, smooth and polished, are less frequently affected by stain, for the same reason that salivary and other deposits are not likely to be found on polished surfaces. It requires depressions, either minute or more defined, to afford lodging-places for the initial de-

posits, and hence eroded enamel is more predisposed to pigmentation than that which is perfect.

It is evident that the same rules as to classification cannot obtain with children. We must eliminate the metallic causes and search for other origins. Sufficient still remains in the action of ferments. There is not the same diversity in the color of the pigments, and this leads to the conclusion that there are fewer causes to classify. At first thought, we might imagine that the enamel-cuticle plays an important part in the green-stain of childhood, but it has been shown that it has appeared on the surface of phosfate fillings in the deciduous teeth. That it may be changed by the application of bleaching-agents like peroxid of hydrogen, would indicate that it is of organic origin, though it does not positively demonstrate it. There is a constant decomposition of food about the teeth, and bacteria are especially active in the oral cavities of children. The secretions of the mucous glands, that are somewhat specialized at the gum-margins, are frequently degenerated, and under the action of ferment organisms decomposed, and this may cause a pigmentary deposit, which will naturally follow the festoon of the gums and give the crescentic appearance which the green-stain of childhood usually presents. It follows, then, that this form of discoloration should probably be classed with those which are of fermentive or bacterial origin.

CONCLUSIONS.

The chief point of interest to us, as dentists, arises from the question as to whether these stains are an etiological factor in pathological conditions.

The erosion that is often found beneath it must have preceded its deposit, for it invariably ceases when there is a complete coating over the eroded places. It never penetrates beneath the enamel-cuticle when that exists on the tooth. It may be dissolved by chemical agents, and the most careful chemical analysis shows nothing in it that would be injurious. While it may be infected by bacteria, and while the stain may be the effects of micro-organisms, it cannot be shown to entirely consist of those organisms. Heide and Charpentier believed it to consist of leptothrix threads, but later observations show that this was an error.

Cosmos.

We should never use any deception, especially with the children. Many people oftentimes want me to do things that are deceptive to children. I do not believe it is a good plan; for if we can gain their confidence, and be worthy of it, it will be a blessing to them and to us. *A. H. Mc Candless.*

SHOULD NOT THE INCREASE OF DENTAL SCHOOLS BE RESTRICTED?

Summary by Cosmos.

Dr. Louis Jack.

Referring to the rule of the National Association of Dental Examiners that a prerequisite to application for recognition by that body must be previous admission to the National Association of Dental Faculties, and the requirement of the latter body that an applicant for admission to its ranks shall have the indorsement of the Board of Dental Examiners of the State in which it is located, Dr. Jack gave as one of the reasons for their adoption the conviction of both bodies, that the increase of schools was proceeding at too rapid a pace. There was also a sentiment that a greater requirement than additional schools was an extension of the field of instruction, and an enlargement of the curriculum of the colleges already recognized; that the newer schools and those under organization are not being installed with the equipment of faculties and instructors they should have.

In 1891 there were twenty-four schools recognized by the National Association of Dental Examiners. In 1892 one dropped out and five were added to the list, making twenty-eight recognized schools. In 1893 there were eight unrecognized schools; in 1894, fifteen. Of these, three have been recognized this year, making thirty-one recognized schools, while there are now eighteen unrecognized. The diploma of an unrecognized school has a legal value in the State where the school is located; it gives no *prima facie* right to practice elsewhere without examination by the State Board, and in some States the holder would not have the privilege of being examined.

A manifest tendency is now in the direction of the establishment of dental departments in connection with medical schools. Of the thirty-three schools in the Faculties Association in January, 1895, but five are of this class; while of the ten listed outside of this Association seven are of this class, and of seven unlisted schools five are of this kind, and others are in contemplation. It does not augur well for the interests of the dental profession that the generality of the medical schools entering into this enterprise are not leading ones. Well-established and strong medical schools have no disposition toward such extension. They have not the room or the facilities to honorably engage in it. In reference to dentistry, this now requires an installation far beyond what the ordinary medical schools can furnish.

Dr. Jack then noted, in a general way, the requirements for teaching dentistry properly, and showed the difference between a dental department attached to a medical school and one affiliated with a university, and the advantages which the latter has over the former. In view of the fact that there are over one hundred and fifty medical schools in the United States, it does not require any stretch of imagination to perceive the danger which lies before us in the direction indicated. Neither is there any question, in view of these considerations, that some restriction should be placed on these institutions, unless they make equal provision for instruction with the best-equipped schools already in existence. Referring to the estimate in which the American dental degree is held in Europe, Dr. Jack concluded that in case some brake is not put on the addition of dental schools which are not of a high order, the prejudice against the dental institutions of this country must further increase. In this country the States cannot regulate the number of schools, which may increase to injure one another by surpassing the demand; but in the survival of the fittest the public suffer by the degradation of the standards and, consequently, from the inferior qualification of the product. In Europe these questions are carefully governed by the state. Here the crystallization of sentiment into law is more lax, is inharmonious and uncertain of enforcement; and therefore we have to depend on the development of opinion to assist and support such bodies as the Associations of Faculties and Examiners in the formulation of rules to guard the interests of all concerned, and to aid in checking the degradation of our profession.

The influence that each one exerts in all-powerful. The keynote that is set at the commencement of a meeting will vibrate through it all. The influence of leading men like Chapin A. Harris, like Bond and others, is a powerful agent for the elevation of the profession. It is the duty of every dentist to feel that he is living in the eyes of the world; that he is the representative of a formative profession. At this time it is blossoming out, the calyx is opening, in the hope that hereafter the fruit shall ripen for the harvest. Dentists sometimes forget this. We are not living here simply for the amount of money we can make. The man who devotes himself entirely to the making of money is not the man who gets the most out of life. We are all acting on each other. The very contact with an active mind makes our own hearts sing with joy, makes them vibrate with all the activities of life; and when we put our own minds in harmony with others, how much we can do for the benefit of our fellows. *Dr. Barrett.*

PAIN CAUSED BY SUPERNUMARIES.

In Odontological Society of Pennsylvania.

I would like to speak of a gentleman who had suffered for about eighteen months with neuralgia. He had been to his dentist a number of times and had his teeth examined to find, if possible, the cause. In this emergency the upper wisdom tooth on the painful side had been taken out. That was the history when he came to me to see if I could give him relief. There were no cavities or dead teeth on the affected side, but a broken root of the extracted wisdom tooth remained, which I removed.

In sounding the bottom of the old socket I detected the crown of a tooth opposite the posterior buccal root of the second molar. I endeavored for half an hour to extract it without losing the second molar. Finding this impossible, I took out the second molar, and then without difficulty extracted a second wisdom tooth that was lying on its side with the crown surface pressing against the roots of the second molar. The gentleman was cured of his neuralgia.

Dr. Peirce, the President, then related the following: A somewhat analogous case was that of a lady of about forty years of age, who had been wearing an artificial denture for eight years. A tumor appeared, which grew to some size, and the patient suffered considerable neuralgic pain. I made an incision in the tumor, and took out three teeth impacted together. One was of nearly normal size, the second much smaller, and the third very small. Relief was afforded after these were taken out.

They were located on the right side of the upper jaw, and a hole had been cut in the plate so as to give room to the tumor.

The larger one, which alone could be classified, appeared to be a third molar; the other two were much smaller and could not be designated as any particular tooth. The operation gave entire relief. *International.*

GREEN-STAIN.

Dr. S. B. Palmer, Syracuse.

A man, fifty-three years of age, whose teeth have been under my care for thirty-five years, called eight months ago, and, to my surprise, presented the most pronounced green-stain I ever saw. The upper centrals had a thick deposit extending from the gums over one-half the length of the crowns; color, dark green; the laterals not coated so heavily and color lighter; both color and deposits shaded down to second bicuspids. The thin deposits were

a nice shade of green. The lower teeth had less deposit, and all on the labial surfaces. I have no recollection of having to remove green-stain from the patient's teeth before. The removal was attended with great difficulty, showing it to be genuine. The enamel had become roughened under the thick portion on the centrals, not so deep as to hinder an even surface and good polish. It has not returned. The practical lessons drawn from this case are as follows:

Green-stain will appear on the teeth of adults when the conditions are favorable.

This patient was on the road for a confectioner. He had not used a brush for a long time; said he had neglected his teeth, and would do better. In answer to the question, "Do you eat much candy?" said, "No; probably not much more than you do." He said: "This is the only kind I eat, and but little of that," and took from his pocket and gave me two pieces of molasses candy nicely done up in waxed paper. It was a soft candy, and contained starch or glucose; it was not all sugar. To me it was evident that this candy was daily indulged in. Thus we have neglect and sweetmeats as a cause in this case. It showed that the deposit did roughen the enamel. The difficulty of removal showed a genuine case of green-stain. It proved that, with proper care with brush and powder, the pigment did not reappear. It also led to investigation as to the cause why the stain is less on the lower teeth, and also why it is usually found on the front teeth, growing thin back to the cuspids or bicuspids. The lower teeth presented an unusual amount on the labial surface of the incisors and cuspids, though not as much as on the upper and none on lingual surfaces. The latter surfaces were covered with a soft, black tartar, colored with cigar-smoke. The tartar closed the spaces on the lingual side, which prevented the washing of saliva through the spaces to the labial surfaces. This suggested that saliva might be a preventive, or solvent of the pigment. Bearing this in mind, I have looked for indications of proof. We find little stain in connection with the saliva-ducts, and most frequently where the lips prevent free circulation. In support of this theory a lady presented a well-cared-for set of teeth with no stain except on the second and third lower molars. On either side the teeth leaned in, and were protected from the brush by the first molars and teeth forward. There was no appearance of stain on the upper molars or the incisors, the mouth in general being well cared for.

By close observation I am convinced that, with saliva-ducts discharging freely under the lips, there would be little green-stain and still less erosion of enamel. *Cosmos.*

PRACTICAL POINTS.

Mrs. J. M. Walker, Bay St. Louis, Mississippi.

Sensitive Tissue in Root-canals after Pulp Extirpation.—Nitrat of silver, carried to the sensitive point and left there a few hours, will usually relieve the trouble, and the canal can be safely filled. *A. W. Holmes.*

Apply a little crystal cocain, followed by a small thread of cotton, leaving it in twenty or thirty minutes. *S. A. White.*

Wrap a thread of cotton on a broach, dip in carbolic acid, and place in the canal, leaving it for five or ten minutes.
B. B. Smith.

Relief of Pain from Congestion of the Pulp.—Wash the cavity with peroxid of hydrogen, and quickly dry it. Apply pure chloroform on cotton, then melted carbolic acid. In five or ten minutes the patient will be comfortable. *A. W. Harlan.*

To Save Badly Broken-down Molars.—Adjust a band of platinum, 28 or 30 standard gage, to fit perfectly the gingival border, soldering with pure gold and running enough gold around the inside to form a very thin lining. Make a very thin mix of amalgam, and with a spatula spread it around the inside of the band at the edge nearest the gum. Dry the tooth; place the band in position, burnishing it well up around the root, the thin amalgam making a perfect joint. Fill up the band with a thicker amalgam, which will take up the excess of mercury from the thinner mix, and unite with the gold on the inside of the band, forming a solid mass to be burnished and polished, making a most enduring crown.
C. K. Van Vlick.

Packing Pyorrhea Pockets.—Pack with a salve made of lanolin, sozo-iodol and zinc. If too astringent, substitute bismuth. Sometimes sulfat of zinc, made into a paste with gelatin, has happy results. *W. X. Sudduth.*

Pulp Capping.—I have for years successfully filled more than 90 per cent of cavities having the pulp entirely uncovered, but healthy, by first covering the pulp with a mixture of creasote and oxid of zinc; then beginning with amalgam so soft that it would flatten if let fall a few inches, adding pieces gradually mixed more and more dry, till at the surface the burnisher will move over it with a creaking sound. *D. S. Thomas.*

Persistent Hemorrhage after Tooth Extraction.—

℞.—Tinct. digitalis.....fl. ʒiss.
Tinct. catechu.....fl. ʒj.
Fl. Ext. ergote.....q. s. fl. ʒiij.
M.—Sig. Dessertspoonful every two hours.

Give one dose, and then syringe sockets with hot water and pack each socket tightly with absorbent cotton dipped in tannic acid. Place a piece of rubber-dam over the plugged surfaces, and insert a lump of warmed wax with metal.

German Silver Matrices.—Roll a piece of German silver to 36-gage, and cut in strips averaging $\frac{3}{16}$ inch wide and 6 inches long. Roll on end, on itself, to a coil of $\frac{1}{16}$ inch, and fill with soft solder. Roll the other end to a coil of $\frac{3}{16}$ inch, or preferably solder to a ring to slip on the finger, by which it is held taut by operator or assistant. *G. A. Bronson.*

To Abort an Alveolar Abscess.—Paint the inflamed gums several times a day with a mixture of

Tincture of iodin,
Tincture of aconit.....āā ʒj.
Chloroform,
Tincture of benzoin.....āā ♏xv.
The Practitioner.

To Prevent Dark Joints in Vulcanite Work.—Grind gum sections to fit closely, and, just before removing from articulator, remove every other block, and touch the joints with a little oxiphosphate cement, mixed thin. Replace the blocks and wipe off all surplus cement.

Antiseptic Tooth Powder.—

Resorcin..... 20 parts by weight.
Salol..... 40 " "
Powdered orris root..... 80 " "
Powdered chalk.....400 " "
Carmine, No. 40..... 3 " "
Oil peppermint.....q. s. to perfume.
Merck's Bulletin.

Salol and Oxid of Zinc in Root Canal Filling.—Mix salol, in crystal form, with oxid of zinc, before combining the latter with the phosphoric acid. Used in this way, after thoroughly dessicating the canal, salol gives very good results as a root filling. *H. C. Register.*

Trichloracetic Acid in Pulp Canals.—In opening in the root of a tooth with a dead pulp, trichloracetic acid will destroy the putrescent odor and purify the contents almost in a moment. *C. N. Peirce.*

Milliner's Needles.—The milliner's needle is very long and the tapering is very slight. The temper can be readily drawn, and when fitted into a round handle it makes a nice instrument for exploring. They can be obtained in very small sizes.

Dr. Merriam.

Treatment of Infected Root Canals.—Use sodium and potassium (Schrier's preparation), followed with twenty-five per cent pyrozone and thorough drying with hot air.

D. McQuillen.

Root Canal Cleansing.—Remove all decayed substance, using peroxid of hydrogen freely. Insert a dressing of cotton saturated with carbolic acid, peroxid of hydrogen or listerin, according to degree of putrescence. Continue this treatment as long as the odor of putrescence persists; fill only when there is entire absence of odor. *Dr. Allen.*

Arsenical Paste.—

Arsenic (Scrib's)	1 part.
Iodoform	4 parts.
Carbolic acid	q. s.

To make a paste.

Apply on cotton size of pin's head; cover with tin cap; seal with oxiphosphate. *Jas. Truman.*

Pulp Protection.—To protect the pulp from thermal shock, or irritation, cut two disks of rubber-dam. Touch the cavity floor and walls with pure mastic varnish and apply one of the disks; on the second disk place a little soft cement, and with fine-pointed pliers apply, cement down, on the first disk, spreading the cement under the disk with a ball burnisher. *W. Storer How.*

Relief of Pain from Exposure of Pulp.—

Four per cent solution of cocain	20 parts.
Pure oil of sassafras	30 "
Melted carbolic acid	50 "

Shake the bottle before using, if the mixture is fresh.

N. W. Harlan.

Mending Broken Plaster Casts.—Nothing equals oxiphosphates for mending broken plaster casts or plaster teeth.

Gordon White.

Setting Crowns with Cement.—Before setting the crown wipe the gums around the root with a solution of perchlorid of iron, which will prevent weeping, protecting the cement till crystallized. *E. L. Custer.*

OUR QUESTION BOX.

With Replies From The Best Dental Authorities.

[*Address all Questions for this Department to Dr. E. N. Francis, Uvalde, Texas.*]

Question 211. *Please give formula for mouth wash to use after extraction. The patient is suffering great pain. Teeth were "sore" before extracting. Hot water does no good.*

Listerin, Pond's extract, tincture of myrrh, tincture of calendula—either of these are excellent.

Myrrh or calendula, tablespoonful to glass of water, and use often.

L. P. Haskell.

Question 212. *Good fit for lower rubber plate, but patient does not wear it, alleging nausea as an excuse. Patient does not object to the taste of rubber, and plate is not of unusual size. What can I do?*

Have never known of nausea arising from wearing lower plate. Should look for cause in the plate extending too far back, or being too wide, so as to be lifted by the tongue, a thing that should always be avoided.

L. P. Haskell.

[The following is exact copy of question as received.]

Question 213. *To Editor—physician age 47, has the First lower Bicuspid on the Buccal distal surface near the gingival line the surface is perfectly smooth But a slight off-set of the enamel organ, I pronounced the case sensitive dentine, while my competitor pronounced it necessary to spread teeth with rubber and drill cavity in a live tooth and fill, do you think this proper?)*

My treatment was to clean surface thoroughly and dry it, then apply nitrate of silver until you got relief and wash off stains with spt. of ammonia and Iodine. Would like to hear from the profession on this Question, there are many of us involved in this answer.

(Signed,) Chicago Dentists.

This question was to be decided by the "Items of Interest." Is there any danger in separating the teeth at that age?

If the querist will carefully read the above, he will find his question is not very clear, and it would probably be a difficult question to answer under any conditions without a personal examination of case before the tooth was drilled and filled.

For reasons given above we have failed to obtain answers as requested.

It would do no harm to try your treatment, as a filling could be inserted at any time if necessary.

This question of drilling cavities is a very serious one. If a tooth can be saved, or prevented from decay by chemical or frictional treatment, do not drill a cavity for the sake of the "mighty dollar."

We are acquainted with a dentist who is quite expert in the art of drilling cavities, and his drill-hole fillings have quite a reputation for their staying qualities. The number of "condensed" books of gold he can put into a drill hole, the size of a pin's head, is quite enough to make a circus advance agent blush. The last examination chart called for twenty-one cavities; but after an examination by other dentists, and a failure to find a cavity, he lost the work, but made it up on the next case.

If your friend has done wrong, he knows it, and that is punishment enough. We cannot decide in this case; we have nothing to work on but a description too vague for consideration. There is some danger in separating teeth at this age.

The following answers were received for last month, too late for insertion.

No. 202.—Stop the use of tobacco, and sensitiveness will probably disappear; if not, apply a saturated solution of carbonate of potash in glycerin immediately after eating. Wipe the sensitive surfaces dry, if possible, and apply the solution liberally. Instruct patient to make the application as indicated till trouble disappears. Two or three weeks may be necessary to complete a cure; but will be of no avail, if the tobacco chewing is continued.

If the case is suitable, crown- and bridge-work might be of value in restoring proper articulation. I would not advise such extensive work, unless the tobacco can be gotten rid of, and the case is otherwise suitable for this class of work.

No. 203.—To give an answer of value I think this querist should have stated which lower molar was devitalized, and also whether all of the third molars were developed, and in their proper place.

If the tooth is a third molar, I should suspect it, and extract. I have relieved two cases of this description by extracting all of the third molars.

If the tooth is a first or second molar, I could not hold it responsible for the condition stated.

Earl D. Eddy, San Francisco, Cal.

Question 214. *A man fifty years of age, lymphatic temperament, and in a decided anemic condition. His teeth were completely enveloped in sanguinary calculus. I removed this with care to avoid irritation, but in a few hours he returned with an excessive hemorrhage from gums, which had been in progress for an hour.*

After using liquid ferri subsulfatis, tannin and styptic colloid, without avail, I cleansed the parts with ice and ice-water, and then thoroughly coated the entire mucous membrane with sandarac varnish, which is still in place and has prevented a return of bleeding so far. I am confident the cause of hemorrhage is insufficient fibrin in the blood, as the patient had similar trouble, in a more moderate form, a year ago. This I did not ascertain previous to my operation. The former hemorrhage continued several days but

was confined to one tooth, while now it is much greater both in volume of blood and surface effected.

What shall I do if hemorrhage returns?

If hemorrhage recurs, use the same treatment. It cannot be improved. In meantime have the patient use tincture chlorid iron or some other good blood tonic. *S. C. A. Rabey, Clinton, Mo.*

If the hemorrhage returns control with some of the styptics. Should they fail resort to the actual cautery.

Patient doubtless needs tonic treatment, some of the preparations of iron, plenty of fresh air, and exercise.

J. W. Gale, Chippewa Falls, Wis.

If hemorrhage returns apply liquid ferri subsulfate or tannin, and immediately press modeling composition, not too soft, around teeth and on the gums.

If held in position till thoroughly hardened this will be an effective compress. It indicates the need of a general systemic treatment.

A. L. Brown, D.D.S., Perry, Iowa.

I would advise the application of my stypic, viz : nitric acid and creasote.

Place on the bottom of tumbler a small amount of nitric acid, prepare good sized pledget of cotton, dip the cotton in creasote to one-third of its depth, then dip the pledget of cotton in the acid and press it along the gums, slowly, till the desired effect is obtained. This is the surest styptic that can be employed. *I. J. Wetherbee, Boston, Mass.*

Your patient evidences a pronounced hemorrhagic diathesis, and caution should be observed with such individuals in all operations that open even the smallest vessels through which flows the life current.

If the hemorrhage returns, deluge the part with cold water from a Moffat Syringe, after which inject beneath the disturbed margins of the mucous membrane, around the teeth, a mixture of equal parts of tincture nux gallac and tincture catechu. The gums may also be dusted at frequent intervals with a powder of equal parts of tannin, salicylic acid and bicarbonate soda. *Chas. E. Francis, D.D.S., New York.*

Brush the teeth carefully and thoroughly with water ten parts, and sulfuric acid one part, using a long, bristle brush of medium stiffness, with rows of bristles far apart. Get the liquid well down and around the necks of teeth to the full depth of pockets made or exposed by removal of calcarious deposits.

If necessary, reapply the liquid without use of brush, in the course of thirty or forty minutes, then if hemorrhage continue administer internally two (2) grain doses of galic acid every hour for several hours and the chances will be favorable for cessation of hemorrhage.

Prescribe as judgment may direct to improve quality of blood.

B. F. Arrington, Goldsboro, N. C.

Question 215. *A man has a fungus growth in the roof of his mouth opposite and half inch from bicuspids. In color it is slightly yellow; in circumference a little over a half inch, having the appearance of a large seed wart; pliable like rubber and the thickness*

of a twenty-five cent piece. It resembles the thick gristle of beef; no soreness and the top is perforated like cauliflower.

What is it, and what shall I do?

Excise to the bone, thereby removing tumor. Scrape the bone and apply creasote to cauterize the soft parts. *I. J. Wetherbee.*

Facts are too limited to base a diagnosis. It may be a papilloma, or possibly a carcinoma. It should be removed by galvanic cautery.

S. C. A. Rubey.

Examine carefully for dead pulp; if none is found, clip off a small bit of the growth and subject it to the microscope to determine its nature, and proceed accordingly. *J. W. Gale.*

It is a nameless excrescence; a freak in nature without definite classification. With a sharp instrument remove it entire, and dress the wound several times daily, for several days, with campho-phenique.

B. F. Arrington.

Not easily diagnosed. It may be caused by irritation of roots, of process, or possibly of syphilitic origin—though not likely. It most resembles a warty tumor. If it has been in evidence a short time, and is not growing, use a styptic wash and let it alone. If it shows a disposition to enlarge, cut out, stopping hemorrhage by a styptic or the actual cautery, using antiseptic and astringent mouth wash afterward. *A. L. Brown, D.D.S.*

From description, I imagine it a fibroma of a benign nature. A small clipping from the fungus, if subjected to proper microscopical examination, will reveal its real character. If perceptibly increasing in growth, remove it, especially if an epithelioma. If extirpation is your decision, make it thorough, followed by cauterization.

Styptics should follow hemorrhage. Persulfate of iron, on a piece of soft prepared spunk, held firmly against the wounded mucous membrane, will check the flow of blood. In addition to topical treatment, I would advise, as a tonic, Phillips' phosfo-muriate of quinin.

Chas. E. Francis, D.D.S.

We have, at this late date, just learned of the sudden death of Dr. A. A. Hazeltine, of New Bedford, Mass. His daughter writes:

"He died very suddenly with heart disease. He was always much interested in the ITEMS and your letters, and one of the last things he read was the December ITEMS containing a short article of his composition."

His daughter, Miss Katharine W. Hazeltine, always helped him in his work, and now, that she is entirely alone, has accepted a position as assistant in the office of Dr. N. A. Stanley, of New Bedford.

We have had no acquaintance with Dr. Hazeltine except through the Question Box, but our correspondence with him resulted in many practical and interesting answers, and a feeling of great respect and friendship resulted from his manly and kind treatment of subjects brought to his notice through our department.

We sympathize with Miss Hazeltine in her sad bereavement, and admire her resolve to follow in the footsteps of the father and honor the profession he served.

ITEMS.

The dentist should always be thoroughly dignified with those with whom he comes in contact, and in the office more particularly than anywhere else. *A. H. McCandless.*

* * *

To finish rubber plates use about one-third emery with pumice. Saves half the labor and time. The palatal surface is covered with oil of glycerin to remove the last traces of plaster. *Southern.*

* * *

How easy it is to write an article for publication and leave out something. I undertook to follow Dr. Allen's advice about vulcanizing at 300° instead of 320°. Result is a soft vulcanized plate and half a day's work wasted, a patient very angry because of delay, and devil to pay generally. I vulcanized one hour. Why didn't he say an hour and a-half. *H. F. G.*

* * *

RULE FOR MAKING SOLUTIONS.—To obtain a certain strength solution the following rule may be followed with accurate results: Multiply the number of grains contained in a fluid ounce of water (480) by the percentage number. For example; if you should want a four per cent solution of cocain, multiply the number 480 by .04, and the product, which is 19.20 grains, is the number of grains required. *D. E. Wiber, D.D.S., Washington, D. C.*

* * *

Have you always gone to your chair or to the work in hand in the best physical condition possible? This is of importance; if the hand is unsteady and the eye dimmed, our place is not at the chair. We should avoid excesses, and see to it that our diet is correct, our sleep full and refreshing, so that with a clear head we can "think and reason correctly, and carry out well-laid plans with skill and dexterity." *J. N. Crouse.*

* * *

If chloro-percha sufficiently thick is pumped in a canal and a cone is thoroughly driven home in it, the chloroform holding the previously introduced chloro-percha in solution will attack the surface of the cone and make a homogeneous mass of it, filling completely the entire chamber and canal, and it will remain so filled, especially if the mass is capped over with some such non-shrinkable material as any cement plastic. We are not supposed to introduce at first a lot of chloroform with a little gutta-percha in it, but a little chloroform with as much gutta-percha in solution in it as it will take up. I have practiced this method for six years with but few failures. *H. H. Schuhmann.*

The dentist should keep himself in the very best physical and mental condition to do the best service to his patients at all times. He should not jeopardize his health by sitting up late at night. He should not abuse himself either mentally or physically in any way; but he should always go to the office in the morning feeling in the best condition possible to do the highest class of service for his patients. *C. N. Johnson.*

* * *

We all have patients who come to us so nervous that it seems almost impossible to do anything for them. I think the greatest kindness we can do them is to do nothing but some trifling operation at the first visit, and show them that the operation is not so bad as they expect; and we can quiet their nerves and dismiss them for the first time with the assurance that nine times out of ten they will come back a great deal better the next time.

A. H. McCandless.

* * *

As a bleachant from within the tooth, pyrozone seems to be the only thing now known to the profession that will restore, with any show of permanency, a pulpless, and, therefore (therefore in a majority of cases), discolored tooth to a shade approaching that of its ante-pulpless days. This property of pyrozone has been taken advantage of pretty generally, and discussed to that extent that nearly, if not quite, everything claimed for it is conceded.

S. B. Palmer.

* * *

The relation of the dentist to his patient is so close that he always of necessity leaves some impress; whether for good or evil depends entirely on the soul of the man who performs the operation. The Great Teacher said to his disciples: "Ye are the light of the world." So the dentists of the country are the light of the country, on the subjects with which they have to deal. We should carry a high standard, and we need that supplemental knowledge which alone can give the broad and grand view we should take of our work.

W. H. Jackson.

* * *

Refitting Dentures.—Thin the plate by filing or scraping the palatial surface. Then place a mixture of plaster of a creamy consistency to slightly cover the surface, and take impression as usual, only bring to place by closing the teeth so as to get a correct articulation and force out excess of plaster. Flask as usual with out separating. Separate flask and remove the thin layer of plaster used for the impression. Roughen the surface of plate and pack a thin layer of rubber in the ordinary way. Relieve hard parts before reflasking or after furnishing.

S. P. Gibbs, M.D., D.D.S., Chicago.

EDITORIAL.

OUR EVILS.

Instead of dreading and magnifying our unavoidable evils, we should use them; instead of allowing them to dominate and depress us we should subordinate them. Evils will always surround us in some form, and we must master them or they will master us. Some are moral evils that should be entirely rooted out and thrown away, others are evils that by forceful efforts may be turned into good, and others, inevitable evils that must be endured, but may nevertheless be made our servants.

That person who has no weakness to overcome, no enemies to subdue, few oppositions to surmount—he who in his struggles has no heart-aches, no deep felt want, no impossibilities to climb over, usually acquires little power, attains little distinction, and has none of the luscious fruits of a grand, matured, well-developed character. It is our contentions with and triumphs over evils that give us the discipline and culture which produces growth and strength, and prepares us for usefulness, stability and true greatness.

When, therefore, an evil forces itself in our way, our first thought should be, not so much how we may avoid it, as how we may overcome it—not so much how it may bring disaster, as how we may turn it to good account. We should never have heard of good and great Diogenes if he had not been banished from his native country, with the loss of all his goods. He was forced out of the arena of trouble, strife and confusion to an isolation of philosophical contemplation and severe discipline, which developed slumbering powers he had not dreamed of possessing. Many a man has found wisdom and strength and success in sudden disaster and defeat. Thrown out of the whirlpool of business excitement and perplexity, he has time for reading, reflection and wiser plans. Many a sad-hearted woman, striving to rise to some honorable level of usefulness, has found in the stimulous of opposition, the sting of ridicule and the extremity of failure the solution of her ambition. A bright young man is spurred on to success by over-

coming difficulties. The sluggish fire of ambition might have gone out had not some intermeddler sought to smother it by throwing on turf. But the more turf was thrown on, the more the fire had to feed on, till finally the pent-up heat bursts forth into an irrepressible flame. Sickness is an evil, but many a man has found its subduing rest the grand beginning of his life's work.

If there was nothing we call evil to disturb our selfishness in acquiring wealth and fame and pleasure, these "good things" would be our destruction. What we call our chief good may be deceiving, slavish indulgence; many a time the very things we hug tenaciously are in their effects our grestest evils; and those disturbing, annoying, unwelcome things we call evils are in their effects our greatest good.

We are, many of us, enclosed in an environment that we make our idol; but which really cramps our energies, warps our judgment and enervates our powers. O! for some devastating fire to burn us out, and force us into the broad fields where flowers flourish; where bees find their honey; where great trees grow. Then we, like the flowers, might give out fresh fragrance; like the bees, we might gather pure sweets, and like the great trees we might attain a stalwart growth.

THE POETRY OF NATURE.

God writes poetry on everything he has made, and every one who is godly is a poet.

Yesterday I saw God write poetry on the heavens. As His gorgeous sun peeped from behind the fleeing clouds, just after a rain, it sent out every conceivable tint of poetic beauty; it painted the very atmosphere with splendor. In its tracings you could fairly see the glory of heaven bursting through. All nature put on its brightest array, and all animation shouted in wonderment. The flowers laughed and the birds sang beautifully.

Last evening I saw God write poetry in deeper hues on a great sheet of western sky. It was transporting! O! that I had

the colors, and the art, and the delicate skill to copy it. But no; an angel could not do it. It was opening, for a moment, the gateway of paradise, with angels going in and out. I could almost hear them singing.

As this panorama passed, God wrote poetry among the stars. I gazed and gazed as the beautiful scene voiced His words, and entertained me with the language of the firmanent. In their glittering whiteness the stars were window pains, through which I could see heaven, and angels, and God, and out of which came to me heaven's effulgence and rapture of the heavenly lyre.

The night of winter was on the earth. All was silence and gloom. Dreary, cold and a frosty mantle covered everything. But look! God sends a sweep of morning athwart the heavens and the very snow sparkles with a thousand diamonds; they fairly blaze into my soul. Then, with a sunbeam for His pen, God writes poetry on the frosty sheet, and nothing can be more beautiful and inspiring.

But why particularize? It is only to look for poetry through a poetic soul to see it everywhere. Heaven and earth and sky are filled with His choir, giving forth exquisite sentiment and charming music. This whole world, with the canopy of heaven as its shining roof, is a cathedral of poetry and song. It is when we are out of harmony with God and His works that we feel the discord of hard facts and the misery of sins. In God we are in heaven even here. And that man of business who does not take his heaven of song and poetry into his business will lose everything valuable in his nature.

It is not enough that we avoid being a nuisance. Are we a positive good? It is not enough that we do as well as those about us. Do we do our best? It is not enough that we have the praise of men. Have we the praise of our own conscience? To be only medium in anything is to be too common to be prized, too unappreciated to be rewarded, too poor to be recognized.

HOW TO BE GREAT.

The strong mastiff is not disturbed by the little curs barking at his heels. With what nobleness he passes on his way, with what dignity he minds his own business, with what disdain he ignores all interference.

So it is with a man of strong character, pure motives and inspiring aim. The babel of voices all about him is unheeded, the war of elements does not divert him, the strife of tongues is beneath him. He has a mission, and he passes on to fill it; he has a fixed plan of action, and his whole attention is given to work it out.

Be a mastiff, be a giant, be a stalwart man. But remember, a mastiff is fed on a mastiff's food, not on the weak slops of common living; the giant must grow, to become a giant, he cannot jump into his strength; the stalwart man is made by overcoming difficulties, by trampling on impossibilities, and by drawing to himself every element of power surrounding him.

Golden opportunities are continually passing, seize on them; impossibilities are your opportunities for greatness, master them; the greater your difficulties, the greater your victory, grapple with them.

I know two young men who started out together, but did not long keep together. Both were poor, illiterate, blundering farm hands. Their expenses at college were an embarrassment to both fathers, and each father blamed me for encouraging his son. But it is hard to tell which will prosper and which will fail. I have helped sixteen through college, and sometimes the most unpromising have succeeded the best. These two had such a struggle to get through their final examination that for sometime they were in despair. But the college course was easier then than now, so that by spending the following summer at review each got his diplomas and started out.

One remained near home and was contented with a small country practice. Timidity, negativeness, and want of aggression kept him in a narrow sphere, contented with living from hand to mouth, never being able to pay a single note given by his friends for his college expenses. After ten years he is but little better off

in finances or in skill and patronage than in the first year of his practice.

The other pushed out West into a new, growing section. About as often as the first one would send for a half ounce alloy, a half book gold, and a few sheets of rubber, the other would send for four ounces alloy, a half ounce gold and a pound of rubber. The latter young man has long since paid for his outfit and college expenses, and frequently remembers his father by liberal gifts.

Why this difference? The first was considered the smartest at the start, and it was prophesied he would make the best and most prosperous dentist. But he lacked ambition, positiveness and aggression; the other had these in abundance.

We all have thoughts, and plans and schemes good enough to make us wise, and prosperous and rich; but we entertain them only as transient visitors. We talk to them for a moment, dream of them for a night, play with them, perhaps, and then throw them aside. We flippantly toy with others, and others, and others till days and opportunities and life itself are all gone. What should have been mighty problems solved, and living facts applied, are but romances and bubbles. Life and all its rich imaginings, glowing prospects and beautiful colorings, become only vanity and vexation of spirits.

There are only a few who fructify their thoughts into living things. Still fewer who cultivate them till they bud and blossom. Fewer still who patiently and intelligently attend them till they become stalwart trees, bearing fruit—ripe, luscious, life-supporting fruit.

Some men make themselves a nuisance by being over conspicuous in gab and demonstration. However you may be occupied, they push themselves in and on you, and rattle away till you almost wish you could tell a lie to get rid of them.

They seem to think they are of real importance, and that what they have to say is very essential for you to know, when, in fact, it is mere gibberish. What makes them still more of a nuisance is, that what they have to say is always one thing. They go over and over it as though they had never told it before, and that you never conceived anything half so wise and good. Even when they come before a convention you seem to know just what their theme will be, and how they will treat it.

These people are almost invariably egotistic, brassy cranks. They have outlived their influence. They flatter themselves they are ingenious, or learned, or of exceptional experience, because they have been so long where they are, and know nothing themselves, and their limited sphere.

One thing at the time, and that done well. This is the secret of success. Whatever time it may take; whatever pains it may require; whatever mortification from blunders, repetition and expense, do that one thing well or not at all; for be assured that whatever is worth doing at all is worth doing well. If it is one thing in a series, this will prepare you to do better the whole series; if it is in study, it will prepare you to do more easily every future lesson; if it is a process of skill, it will prepare you the better for everything of future intricacy. Start at the foundation and do the very first act well, and the next and the next, skipping nothing, tumbling over nothing, going around nothing, doing everything well, like "a good and faithful servant;" no hurry, no worry, no flagging. It is patient, prudent, persistent, perpetual action that brings the pleasurable, practical, profitable perfection of a well-rounded character and a permanent business.

Our very unconscious influence will be great if our character is good; and the more symmetrically that character is developed the more lovely and lovable will it appear—the more it will glow and make our life work a pleasure and our life influence a charm. It will shine out of our very countenance.

HINTS.

With the session 1896–97 the dental college term in all the schools in the National Association is extended six months.

* * *

Dr. W. A. Dick, of Colusa, is dead. Though young, he was among the most successful dentists of California. His domestic relations were peculiarly happy, and in his business and in his community he had the faculty of making many friends.

* * *

A man is a pigmy till work and discipline and thoughtfulness give him strength and skill and maturity; and he is not a success if, in attaining all these, he has not retained the vigor, the spring, the inspiration of youthful passions in a healthy body.

* * *

Dr. Marshall Smith says: A shell crown skilfully and carefully made was a good piece of work, and one that he would not discard for anything. He had made them for ten years, and said that they could be made to fit properly.

* * *

A committee of the British Dental Association has examined the teeth of 11,422 school children. One thing shown is that the teeth of children of the rich are more prone to decay than those of children of the poor.

* * *

Dr. Edwin C. Baxter, of Albany, N. Y., is dead. He graduated from Pennsylvania Dental College in 1866, and afterward became Dr. Peirce's assistant in operative surgery, then a partner of Dr. Peirce. He was a very prominent practitioner in Albany for twenty-five years, and a State Dental Regent.

* * *

Professor Cesare Lombroso, the famous Italian criminologist, has discovered that one of the most striking characteristics of criminals is the absence of wisdom teeth. This should not make those people, however, who boast of being without these unnecessary molars feel uncomfortable.

* * *

Permanganate of potash is the new antidote for opium, laudanum, etc. It was first tried in Elmira by Dr. Green who administered a dose to Edward Groom last Friday, after he had swallowed a two-ounce dose of laudanum. His complete recovery, after having the poison in his system for over two hours is a good proof of its efficacy.

Dr. Oscar Meyer, formerly of San Francisco, and now of Sonnenburg, attracted much attention at the Berlin Congress of Surgeons by describing a new method for curing diseases of some bones. He advocated the filling of the bone affected by disease with copper amalgam, and cited several cases in which he had applied this treatment with success.

* * *

Sanatin is an antiseptic and prophylactic that is giving more than ordinary satisfaction. It is a super-saturated solution of boric acid combined with eucalyptol, thymol, menthol, hydrastis, benzoin and gaultheria. It is used internally as an antifermentative, and in catarrh, abscesses, ulcers, etc. In dental practice it is a fine mouth wash and gargle.

* * *

In answer to an inquiry as to what he would do with badly-abscessed roots, Dr. G. H. Claude says: Would open the canal and clean it out, and then dry it with bibulous paper; then place carbolic acid in and leave it for twelve hours; then clean it out again and fill with small pieces of soft gold quite up to the apex; then would fill the tooth, feeling quite sure there would be no further trouble.

* * *

The following resolutions were adopted by the National Association of Dental Examiners:

Resolved, That students in attendance at colleges of this Association are required to obey the laws regulating the practice of dentistry in the various States, and failing to do this, shall not again be received into any of the colleges of this Association.

Resolved, That when a college of this Association has increased the cost of tuition fees, no student shall be received at the former fee except those who have matriculated at such college prior to such action.

* * *

National Dental Examiners call attention to the importance of a higher standard of preliminary education, and to the impropriety of schools advertising, as instructors, practitioners who occasionally clinic before the students, but are not a part of the staff of the institution.

The number of students in actual attendance in all the schools of the country for the session 1894–95, excluding those attending special courses, was 4979, as against 3997 at the previous session; graduates 1208, as against 911.

* * *

Dr. William A. Mills commends the use of the porcelain crown on account of its likeness to the natural tooth. In all operations for restoration of the teeth, the nearer the approach to the appearance and form of the natural organ the more perfect the substitution. Porcelain allows the really skilful and careful dentist to restore the teeth without showing the artificial work, and therefore it is to be preferred wherever it can be used.

FOR OUR PATIENTS.

PASTEUR—IN MEMORIAM.

Heroic deeds to benefit mankind
Will live forever, acts of science find
A lasting record, in history a place,
As benefactors of our mortal race,
To stamp the virulence of dread disease,
And by experiments our ills appease.
Jenner, the first to risk a life so true,
Has robbed the small-pox of its deadliest hue;
Now Pasteur's gone, let's honor well his name,
Illustrious scientist, whose glorious fame
And deeds of brav'y known to all the world.
The rabid virus from its throne he hurled.
Both poor and rich repaired from far and near
To have his treatment; he allayed all fear.
O! may his deeds be crowned with victory.
He risked his life to save humanity.

Forbes Winslow, D. C. L., Oxon, in New York Herald.

A dreamer dropped a random thought; 'twas old and yet 'twas new;
A simple fancy of the brain, but strong in being true;
It shone on a genial mind, and lo! its light became
A lamp of life, a beacon ray, a monitory flame.
The thought was small; its issue great: a watch-fire on the hill,
It shed its radiance far adown, and cheers the valley still!

THE DEPTHS OF SPACE.

A Beginner's Lesson in Astronomy by Sir Robert Ball.

I propose to give in this paper some illustrations of what is known with regard to the distances of the stars, and I shall naturally take the opportunity to make special use of certain recent advances by which our knowledge of the subject has been greatly extended.

The great majority of the stars are situated at distances so enormous that it is utterly hopeless to attempt to determine how far away they are. In fact, only comparatively few stars happen to lie sufficiently close to the earth to permit our making any accurate determination of their position. Nor is it by any means an easy

task to choose out those particular objects which do not lie within range. It not unfrequently happens that after much labor has been expended on observations of some particular star, it has been found that the work is fruitless, and that the star is so remote that there is no possibility of learning what its distance actually amounts to. It might naturally be supposed that the brightest stars are those nearest the earth; and no doubt if all the stars were intrinsically equally bright, their apparent brightness would be a safe guide in placing these objects at their true relative distances. But there is no such simple connection between brightness and proximity as this would imply. We know that the very brightest star in the heavens is Sirius, but we also know that Sirius is by no means the nearest neighbor of the solar system.

The star whose distance is to be sought having been chosen, an elaborate series of observations has then to be undertaken. The astronomer measures in his telescope the sky interval by which that star is separated from a neighboring star, which, though apparently close by, is in reality much further away. Indeed, for this auxiliary star we like, if possible, to have an object which is about ten times as far as the comparatively near star. By means of a delicate instrument applied to the telescope we measure the width of the bit of sky between the two stars, and these measurements are repeated night after night for a twelve-month. This year's series of observations is absolutely necessary, for the astronomer is gradually shifting his own position, and in six months' time this shift will amount to nearly 200,000,000 miles, the earth having moved during this period round to the opposite point of its orbit. The displacement of the observer alters the position of the near star in relation to its more distant companion. We thus find that the sky interval between the two objects changes periodically, and from observations such as these it is possible, by the magic of mathematics, to determine the distances of some of the stars from the earth.

So far as the astronomers have yet learned, the star which lies closest to the earth is one which we do not know in the northern hemisphere, though it is very familiar to residents in southern latitudes. This star is the brightest gem in the constellation of the Centaur, and according to the usual mode of designation, it is spoken of as Alpha Centauri. The telescope shows the object to consist of a pair of magnificent suns slowly revolving each around the other, and animated by movements in the same direction through the sky. Many attempts have been made to determine the distance from us of this celebrated pair of objects. Its distance has been measured by Dr. Gill, her majesty's astronomer at

the Cape of Good Hope, and by Dr. Elkin, of Yale Observatory, New Haven, with all the accuracy which modern science permits.

I do not here propose to state the distances of the stars in miles. I shall endeavor to translate them to ideas more suitable for conveying a due appreciation of the magnitudes involved. The electric telegraph will supply an illustration for the purpose.

Every one knows the unparalleled swiftness with which an electric signal speeds its way along a conducting wire.

The actual velocity attained in telegraphic practice varies according to circumstances. The electrician, however, knows that, even when all the circumstances are most favorable, the speed of a current along the wire could never exceed 180,000 miles a second. We shall employ this maximum speed as the velocity of electricity in our present illustration.

Just consider all that this implies. Suppose that a row of telegraph posts 25,000 miles long were erected round the earth at the equator. Suppose that a wire were stretched on these posts for this circuit of 25,000 miles, and that then another complete circuit was taken with the same wire round the same posts, and then another and yet another. In fact, let the wire be wound no fewer than seven times completely about this great globe. We should then find that an electrical signal sent into the wire at one end would accomplish the seven circuits in one second of time. Provided with this conception, we can now give suitable illustrations of the results at which astronomers have arrived in their researches on the distances of the stars.

Let us suppose that the telegraph lines, instead of being merely confined to the earth, were extended throughout the length and depth of space. Let one wire stretch from the earth to the moon; another from the earth to the sun; another from the earth to the nearest bright star; another from the earth to a faint telescope star; and, finally, let a wire be stretched all the way from the earth to one of the more distant stars. Let us now see what the very shortest time would be in which a message might be transmitted to each of these several destinations. First, with respect to the moon, our satellite is, comparatively speaking, so near to us that but little more than a second would be required for a signal to travel thither from the earth. The sun is, however, many times further away than the moon, and eight minutes would have to elapse ere the electric wave, notwithstanding its unparalleled velocity, had passed from the earth to the sun.

Telegraphing to the stars would, however, be a much more tedious matter. Take first the case of the very nearest of those twinkling points of light—namely, Alpha Centauri, to which I

have already referred. The transmission of a telegraphic message to this distant sun would, indeed, tax the patience of all concerned. The key is pressed, the circuit is complete, the message bounds off on its journey; it wings its way along the wire with that velocity sufficient to carry it 180,000 miles in a single second of time. Even the nearest of the stars is, however, sunk to space to a distance so overwhelming that the time required for the journey is not a question of seconds, or of minutes; not of hours, not of days, not of weeks, nor even months, for no less than four years would have to pass by before the electricity, trembling along the wire with its unapproachable speed, had accomplished this stupendous journey.

Look up to-night toward the heavens, and among the thousands of twinkling points which delight our eyes there is many a one up there so far off that if, after the battle of Waterloo had been won in 1815, the Duke of Wellington had telegraphed the news to these stellar depths, the message would not yet have been received there, notwithstanding the fact that for eighty years it has been flashing along with that lightning velocity which would carry it seven times around the earth in the interval between the two ticks of a clock.

There are stars further still. Fortify your eyes with a telescope and direct it toward the sky. Myriads of stars will then be revealed which would not be discerned without its aid. Nor need we feel surprised that the effulgence of glorious suns, as these spheres undoubtedly are, should shrink to such inconsiderable proportions when we think of the awful remoteness of these bodies. Over our heads there are thousands of stars so remote that if the news of the discovery of America by Columbus had been circulated far and wide through the universe, by the instrumentality of the telegraph, these thousands of stars to which I now refer are elevated into boundless space to altitudes so stupendous that the announcement would not yet have reached them.

And we have still one more step to take. Let us think of the telegraph wire that is supposed to run from the earth to one of those stars which are only known to us by the impressions they make on a photographic plate. It seems certain that many of these stars are so remote that if the glad tidings of the first Christmas at Bethlehem, 1894 years ago, had been disseminated through the universe by the swiftest electric current ever known, yet—those stars are so inconceivably remote—all the seconds which have elapsed in the 1894 years of our present era would not have sufficed for the journey.

Cambridge, England, June 18th.